AN ASSESSMENT FRAMEWORK FOR WALKABILITY IN LIBYAN CITY CENTRES: PUBLIC SPACES IN TRIPOLI

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Copyright Statement

Abstract

Libyan civic and urban centres are increasingly suffering from unwalkable places due to the lack of legislation for accessibility, multiplication of unregulated car traffic, and the absence of adequate urban and spatial planning. In the last few decades, there has been an increasing interest in the field of walkable public open space as a key driver of sustainable urban development and redistribution of land use, to ensure pedestrian and walkable routes between sites of living and workplaces, and to reduce dependence on automobiles. However, in most developing countries, including Libya, there is limited a comprehensive approach and framework to enable and facilitate walkable public open spaces in urban centres.

This research analyses factors and identifies barriers related to walkability in public open spaces in Tripoli (Libya) in two phases: exploring the consistency and validity of effective walkability factors related to the context, using surveys with 25 Libyan specialists, experts, and decision makers; and developing a mixed methodological approach to assess and evaluate current perceptions, attitudes, and aspects involved in determining what makes an accessible and walkable urban space in Tripoli. The empirical study included analysis of a questionnaire survey (using SPSS version 20.0) of 427 users and 108 professionals, and observation of spatial practices and attitudes in four different public spaces in the city.

Focus group discussions were used to validate the results, which showed that safety and security; lack of facilities, and physical barriers; institutional, legislative, management and financial barriers; social and cultural barriers; and transportation system barriers, with varying weights, hinder people's decisions to walk in public open spaces in Tripoli. A framework was developed to assess the significance and extent of these walkability problems that can be used as a basis for public open space making and management in developing countries' urban planning.

To:

My father, Mohamed and mother, Fatima

My wife, Noura

My daughters, Robeen and Roaa

My sons, Abdalmoaz and Abdalmuhaymin

My supervisor, Prof. Mohamed Gamal Abdelmonem

My brothers and sisters

My Beautiful Country, Libya

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To my beloved country, Libya, which granted me this opportunity to be here and to develop and expand my knowledge in my field and also in several other areas. I ask Allah to protect and strengthen Libya.

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List of Abbreviations

WHO	World Health Organization,
POS	Public open spaces
W-POS	Walkable public open spaces
FGD	Focus group discussion
PPS	World Organization for Projects of Public Spaces
MENA	Middle East and North Africa
KW	Kruskal-Wallis test
PCA	Principal component analysis
LW/PC	Low walkable open space with poor environment condition
HW/GC	High walkable open space with good environment condition
LW/GC	Low walkable open space with good environment condition
HW/PC	High walkable open space with poor environment condition
NEWS	Neighbourhood Environment Walkability Scale
NQLS	Neighbourhood Quality of Life Survey
OMS	Omar Al-Mokhtar Street
MS	Martyrs’ Square
AS	Algeria Square
RS	Al-Rasheed Street
ICC	Interclass correlation coefficient

List of Publications

1- Khairi Mohamed A. Abdulla, Mohamed Gamal Abdelmonem, Gehan Selim, 2016. Understanding Walkability in the Libyan Urban Space: Policies, Perceptions and Smart Design for Sustainable Tripoli. International Journal of Civil, Environmental, Structural, Construction and Architectural Engineering, 10 (12), 1602-1610.

2- Khairi M. Al-bashir Abdulla, Mohamed Gamal Abdelmonem, Gehan Selim, 2017. Walkability in Historic Urban Spaces: Testing the Safety and Security in Martyrs' Square in Tripoli. International Journal of Architectural Research, 11 (3), 163-177.

Chapter 1

Introduction

Cities around the world are facing problems due to traffic congestion, air pollution, and traffic accidents because of the fast increase in the ownership and usage of vehicles, and it has become a critical cause of social, safety, and environmental problems in urban areas (Groenewegen et al., 2006). For example, every year approximately 1.3 million pedestrians, cyclists, and motorcyclists worldwide are killed in road traffic accidents, and more than 90% of such deaths occur in developing countries (WHO, 2009). Moreover, traveling in vehicles rather than physical activity (walking) is a major risk factor for overweight and obesity, diabetes, heart disease, and some cancers (United States Department of Health & Human Services, 2002).

Conversely, many of the most serious health problems of the 21st century are due to sedentary lifestyles, and cities that prioritise walking offer increased recreational opportunities, benefiting the economies of such cities (e.g. the retail industry) and their institutions, associated with various health, social, safety, environmental, and economic benefits for individuals compared to life in vehicle-dependent cities (Leinberger and Alfonzo, 2012; Wen and Xu, 2013; Talen and Koschinsky, 2014). Important studies have identified the built environment as an essential factor for integrating physical activity into daily life and thus improving public health (Frank et al., 2003; Sallis et al., 2011; Cerin et al., 2013), and public open spaces (POS) in city centres are important built environment elements, with the potential to increase the intention of walk for the city residents, workers, visitors, and other users (Geh, 2010; Littke, 2015; Pradinie et al., 2015; Chen, 2016).

Urban design, urban planning and transportation studies have inspected walkability in POS as a root solution to many complex problems in modern societies (Gehl, 1989; Hillier, 1996; Choi, 2012). Many researchers focused their research on highlighting the dimensions and factors that underpin the creation of walkable POS to attract a wide variety of people, which has been given keen attention at the policy level due to the generally grim implications of the digital economy and internet of things for traditional cities and urban spaces, with governments and political pressure seeking remedies for the decline of traditional high streets, and seeking new roles for urban institutions whose traditional services are increasingly supplanted by modern technological solutions, such as e-government (Gehl, 1987, 2010; Ewing, 2005, 2010; Sallis, 2005; Southworth, 2006, 2009; Lawrence, 2007; Saelens, 2009).

In additions, previous studies highlighted that POS in developed countries have always evolved following changing public needs and demands (Conway, 2006). More recently, the looming public health crisis of sedentary lifestyles and obesity-related illness has begun to concern governments and increasing attention has been given to the lack of POS in cities in most developing countries, exacerbating problems including heart disease and some cancers (WHO, 2016). Unfortunately, in the cities of developing countries like Tripoli, the POS are mostly used as refuse dumps, for informal trading activities, and for car parking (Abdull et al., 2016). This research looks at the walkable POS (W-POS) and the ways in which dimensions of POS affects walkability in general in Libyan cities, and especially in Tripoli, Libya. It examines the concept of walkability in outdoor POS within the urban context of Tripoli and different zones in the city.

This thesis answers how and why POS are used as walkable spaces in Tripoli. It investigates users and their motivations and ways and times of using POS in groups and individuals, for males and females. The analysis of the findings contributes to the discussion of value and the perceptions of the quality of the POS in Tripoli by presenting the perspectives of the general users and experts, and the knowledge experience of the researcher, in terms of the design and management of POS.

1.1 Problem statement

Cities worldwide have been rapidly expanding for decades (Grimm et al., 2008). Tripoli, the capital city of Libya, is one of the fastest growing cities in the Middle East and North Africa (MENA) region, with a population of about 1,600,000 people in 2010, comprising 27 per cent of the national population (Ali et al., 2011). Over time, city centre properties for redevelopment have become rare, and the number of vehicles continues to increase yearly, reaching over 1.8 million a decade ago (Al-Fenadi, 2008). Likewise; Ismail and Elmloshi (2011.p 3) illustrated that ‘‘approximately 66% of Tripoli’s residents prefer to use their cars and only 34% resort to depending on public transports namely taxi, coaches and microbuses for their transportation activities in the city centre area’’. According to 2008 data, the daily average number of vehicles using Tripoli’s roads is 898,707, at the peak period from 7 am to 7 pm (Ismail and Elmloshi, 2011).

In Libya, rapid net population growth and rural-urban migration were intensified by the discovery of oil and brought demographic polarisation with high concentration in large cities, particularly Tripoli and Benghazi. As noted by UN-Habitat (2013), Libya has the highest urban concentration in North Africa, increasing from 77.89% of the population living in cities in 2008 to 88.9% according to the 2012 census, projected to continue rising until 2030. On the other hand, this increase in the population of Libyan cities in general and Tripoli in particular (the national capital, and the case study of concern to this study) was not matched by a commensurate evolution in public planning.

In Tripoli, the weaknesses of urban form, physical environment and transportation network, roads and pavement exacerbates the auto-oriented system, depresses walkability, and encourage private transportation. In addition, most of the comprehensive plans prepared at different times and by different planning companies and consultants have not been effective, failing to reduce traffic congestion and increasing automobile dependence in Tripoli city centre.

Appleyard (1981) observed that the increasing use of vehicles since the mid-20th century has reduced social life outdoors in urban environments. He analysed three different streets, showing that increasing traffic volume made many residents leave public spaces and focus their lives in quieter suburban or commuter areas, away from POS. In general, Tripoli city centre was already built up and congested before the mass use of cars, according to the traditional medina model of urban design in the region (i.e. with a compact citadel with central POS and surrounding residential quarters enclosed within a city wall). Nowadays, driving has become the primary mode of travel in Libya, replacing more active forms of transportation like walking, biking, and public transit. In addition, from 1995 to 2010 the total registered vehicles recorded increased from 109,750 to 2,424,385. As shown in Figure 1-1, Libya has a particularly high number of road-related fatalities, with the majority of deaths being people in vehicles (WHO, 2015).

As a result of the increase in vehicle users in the context of poor urban planning and traffic management, traffic accidents have also increased. Table 1.1 shows the gradual rise of the deaths number in Libya from 2005 to 2010 because of car accidents. Five people die every day according to the Secretariat of the Libyan Justice, and the deaths are expected to reach 25 cases/day in the coming years (Traffic Office and Licensing of Tripoli 2010; Yahia and Ismail, 2014), which is why it is important to create walkable city centres in Libya. However, the current management paradigm reiterates the legacy system, rooted in trying to adapt the city to the car, and a radical reorientation of solutions brought by public authorities is necessary (Matugh and Lakhder, 2010). This study contributes to this area by providing empirical evidence, supported by prevailing theoretical knowledge, to support the encouragement of walkability in POS in Tripoli.

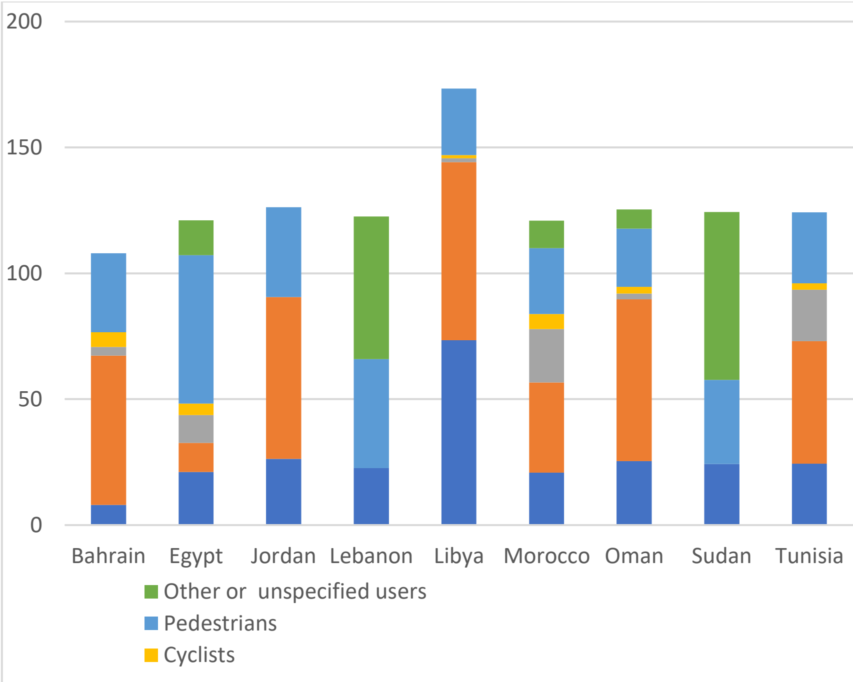


Figure 1-1 Proportion of reported road traffic deaths by road user type in 10 MENA countries, 2013

Source: WHO (2015)

Table 1.1 Road traffic accidents in Libya (2005-2010)

Year	*Accidents*	*Car*	*Deaths*	*Injured*
2005	11898	15276	1800	5380
2006	11982	16890	1866	5663
2007	13165	17859	2138	5950
2008	13352	18662	2332	6424
2009	13664	20668	2301	6791
2010 Jan-Apr	5277	7541	806	2290

Source: Author

Aside from the direct negative safety impacts of automobiles and poor planning, sedentary behaviours associated with living in more car-dependent cities have a range of ill-health outcomes, including weighing on average 4.2 kg heavier (Chiu et al., 2014). Obesity and low levels of physical activity are primary health problems in both developed and developing countries, including Libya. Elmehdawi and Albarsha (2012) explained that ‘Obesity is a global epidemic resulting in major morbidity and premature death. About 64% of Libyan adults are either overweight or obese, obesity progressively increases with age, and two times more common among Libyan women than men'. Rao et al. (1984) found that in Tripoli was 12.6% (with a sharp gender difference: 42.5% in women and 7.7% in men). As Table 1.2 shows, by 2009 the prevalence of obesity had increased by 2.42 times, with a slight reduction among females and a massive increase among males.

Table 1.2 Prevalence of overweight and obesity in different countries

Country	*Overweight*			*Obesity*		
	Male (%)	Female (%)	All (%)	Male (%)	Female (%)	All (%)
Libya (2009)	36.1	29.7	33	21.4	40.1	30.5
USA (1999-2008)	40.1	28.6	34.2	32.2	35.5	33.8
KSA (1995-2002)	42.4	31.8	36.9	26.4	44	35.6
Tunisia (1997)	23.3	28.2	27.4	6.7	22.7	14.4
Turkey (2001-2002)	46.5	28.6	36.8	16.5	29.4	23.5

Source: Ministry of Health-Libya (2011)

Users frequently report their fear of being subject to a crime when they are in dark, empty, and quiet streets (Vrij and Winkel, 1991). Over 50 years ago, Jacobs (1961) wrote about this relationship and established the concept of 'eyes on the street'. One of the main elements of a liveable urban centre is that people feel safe and secure in POS; it is full of people, despite them being complete strangers in most cases. Nowadays Libya has high crime rate, as NUMBEO (2017) shown in their reports based on visitor perceptions over the previous three years; the scores for various aspects of life in Tripoli are shown in Table 1.3. Safety walking alone during daylight in Tripoli Libya is 60.33%, which is high, while safety walking alone at night is 35.87%, which is low. Finding the reasons for the high perceived rate of crime in Tripoli´s public places can help in finding appropriate solutions.

Table 1.3 Crime in Tripoli, Libya

Crime type	*Crime rate in Tripoli*	*Safety rates in Tripoli*	*Categories of Crime*
Level of crime	63.33%	36.67%	High
Crime increasing in the past 3 years	68.48%	31.52%	High
Worries being mugged or robbed	61.96%	38.04%	High
Worries attacked	49.46%	50.54%	Moderate
Worries being insulted	43.89%	56.11%	Moderate
Worries being subject to a physical attack because of your skin colour, ethnic origin or religion	42.78%	42.78%	Moderate
Problem property crimes such as vandalism and theft	53.89%	46.11%	Moderate
Problem violent crimes such as assault and armed robbery	61.96%	38.04%	High

Source: NUMBEO (2017)

1.2 Lack of walkability assessment tools for Libyan city centres

Many tools have been developed with the aim of assessing the walkability environment from users' point of view, in order to be able to address their needs, and to provide answers to the question of how walkable a place is. City centres include public open spaces such as squares, parks, streets, and pavements, all of which have an important role in encouraging people to walk in city centres, and they are the central attractions of cities. Consequently, they can make some cities more inviting and more walkable than others (Ewing and Clemente, 2013).

Most walkability measurements have focused on neighbourhood living and assumed walking motivations that are typical for urban cities, with an emphasis on destinations (e.g. transit stops and parks), as well as detailed assessments of traffic features such as cross-walks and pavement width (Saelens et al., 2003; Brownson et al., 2009; Zenk et al., 2009; Kegler et al., 2015). Lo (2009) argued that many researchers have evaluated the relations between urban environments and pedestrian behaviour, and all have different explanations of how to assess walkable places. Previous walkability assessment tools developed in different disciplines (e.g. transportation planning, urban planning, urban management, and urban design) include the following:

- Walkability Index (WI), the most popular measure in the literature (Saelens et al., 2003).
- Walk Opportunity Index (WOI) (Kuzmyak et al., 2006).
- Neighborhood Destination Accessibility Index (NDAI) (Witten et al., 2011).
- Walkability Scale (WS) (Freeman et al., 2012).
- Pedshed (Ps) (Porta and Renne, 2005).
- Extended Walkability Index (EWI) (Buck et al., 2014).
- Moveability Index (MI) (Buck et al., 2014).
- Pedestrian Index of the Environment (PIE) (Singleton et al., 2014).
- Walk Score (WS), a commercial solution (Koschinsky et al., 2017).
- Neighbourhood Environment Walkability Scale (NEWS), International Physical Activity and the Environment Network (IPEN), Neighbourhood Quality of Life Survey (NQLS), and International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003; Saelens et al., 2003a; Cerin et al., 2007).

Clearly there are many available tools, but few researches have investigated walkable places in developing countries in Arabic language /English language, or whether these tools are suitable to explore walkability in non-Western and non-developed countries, where people may have different walking needs and expectations relative to existing urban facilities. Consequently, this thesis contributes to this field by applying a walkability study to Tripoli, Libya. Developing assessment tools for public open spaces and testing them in developing countries helps transportation planners, urban planners, decision makers, and urban designers to make future decisions on city centre development.

1.3 Safety and security issues in Tripoli

Unfortunately, issues of civil war still exist around the Libyan cities since 2011. Appropriate frameworks were carefully considered to avoid any ethical issues while conducting the research, and the fighting can break out anywhere without warning. Before 2011 Tripoli was a safe city, as the core of the government resided there, and the issues of safety and security. While nowadays, everybody is worrying about their safety and security. The security situation has deteriorated in Libya, and the government is no longer in control. So, the researcher needed to assess when he could safely visit Tripoli and ensure his personal safety. Also, the factor of safety and security become very important for the public open spaces' users.

1.4 Research question

This research thesis addresses the following research question:

- What are the barriers to the implementation of walkability in Tripoli city centre? And what are the main factors influencing users of Tripoli city centre to incorporate walking as part of daily activity in public open spaces?

1.5 Research aim and objectives

The research aim is to provide a comprehensive analysis of barriers and factors that influence effective practices, compatibility, and application of the notion of 'walkability' for urban and civic public spaces in Libyan cities, and to develop a framework for planning strategies for walkability as a creative tool to inform the efficiency, performances, and user experience of a walkable (i.e. walker-friendly) city.

Objectives:

1. To investigate the notion of walkable public open spaces, and best practices of walkable POS in Libyan cities.

2. To develop an evidence-based methodology and measurement tools to evaluate the suitability of those practices for Libyan cities.
3. To explore the demographics, needs, and practices of public users in Tripoli's POS in terms of walkable spaces in a metropolitan centre in a post-conflict situation.
4. To identify users' experiences the time they spend, and the pedestrian movement patterns in the four case study areas in Tripoli POS.
5. To identify the barriers, needs, and success factors affecting people walking in Tripoli POS from the perspectives of users and relevant professionals.
6. To evaluate walkability in Tripoli city centre in terms of planning, producing, managing, and maintaining POS, as well as the factors of walkability, according to the opinions of professionals and experts.
7. To develop and validate a framework for planning strategies for walkability as a creative tool to inform the efficiency, performances, and user experience of a walkable urban environment.

1.6 Research methodology

1.6.1 Overview

To answer the research question in this study, the study developed a working definition of walkability through a literature survey and documentary analysis, which were used to produce a critical overview of walkable space in their theoretical context. The review determines types of urban spaces, its definition and approach, alongside the methods for data collection. This thesis research method uses more than one data collection technique to address different dimensions of the topic. This allows researchers to capture a more complete, holistic, and contextual portrayal of and reveal the varied dimensions of a given phenomenon and provides a better understanding of a research problem than using single approaches (Creswell and Clark, 2007). Mixed methods case study comprising documentary analysis and two phases described below, including Delphi method in phase one, and phase two comprising questionnaire surveys, fieldwork and observation, and focus group discussions.

1.6.2 Phase one: Delphi method

This phase explores the consistency and the validity of the factors of walkability in POS identified from the literature review their revenant to the streets and public squares on Libyan cities in general and Tripoli in particular by matching theoretical insights with empirical data from the studied sites (Sallis et al., 2005; Steven, 2005; Southworth, 2005; Ester et al., 2006; Forsyth et al., 2007; Lawrence et al., 2007; Saelens & Handy, 2008; Ewing & Cervero, 2010; Ayşe and John, 2012; Sapawi and Said, 2012). Participants were selected by a number of strategies. Also, the online survey website Survey-Monkey was used to host the survey.

1.6.3 Phase two

1.6.3.1 Questionnaire surveys

This phase matched the empirical findings with the objectives of this research, using mixed quantitative (questionnaires for users and professionals) and qualitative (observation and focus group discussion) approaches for data collection. Questionnaire surveys furnished data for analysis from questionnaire surveys carried out between **November 2016 and February 2018** concerning aspects of walkability in Tripoli.

1.6.3.2 Fieldwork and observation

The second tool in phase two used in data collection during the fieldwork was observation. This tool was chosen because the researcher had to learn about the phenomenon in its context, in the field. It included the observation of the physical environment, and more important focus on the observation of walking behaviours.

1.6.3.3 Focus group discussions

The third tool in phase two which have been used in data collection during the fieldwork was focus group discussion (FGD). The researcher adopted FGD for the following reasons:

- To validate the result from the questionnaire survey, it was necessary to collect data that was based on human judgment.
- The outcome of the validation process from the focus group was considered as reliable, and the reason behind that was that the people engaged in the focus group was a group of experts who had several years of experience in the area of POS design and management, and to formulate a more in-depth analysis by involving a number of government officials and users.

1.7 Structure of the thesis

This thesis consists of nine chapters followed this introduction, which are outlined as follows.

Chapter 2 (Public Open Spaces) focuses on the existing knowledge and information using various literature sources. This chapter deals with the concept, importance and function of POS in cities in terms of configuration and visual and aesthetic aspects. It identifies types of POS in general and introduces those in Libya relative to theory based on the concept of POS, including the urban environment and its relationship to the walkability and pedestrian movement.

Chapter 3 (Walkability) focuses on existing knowledge and information using various literature sources to provide the precise definition of walkability, as well as determining walkable POS measurement tools and walkable POS dimensions and elements.

Chapter 4 (Research Methodology) explains the research methodology in detail, providing a clear picture of the thesis design, and the overall approaches and methods used in exploring this study.

Chapter 5 (Phase 1: Determination of walkable dimensions and case study areas selection) presents phase one of this thesis (Delphi method), which determines the dimensions and factors that may affect in Libya's POS, and the case study areas selected in this chapter are explained.

Chapter 6 (Analysis and Results of The Questionnaire for the Users) presents the quantitative results of phase two, including the data obtained from the questionnaire surveys for users. This chapter details and summarises the findings using SPSS for data analysis.

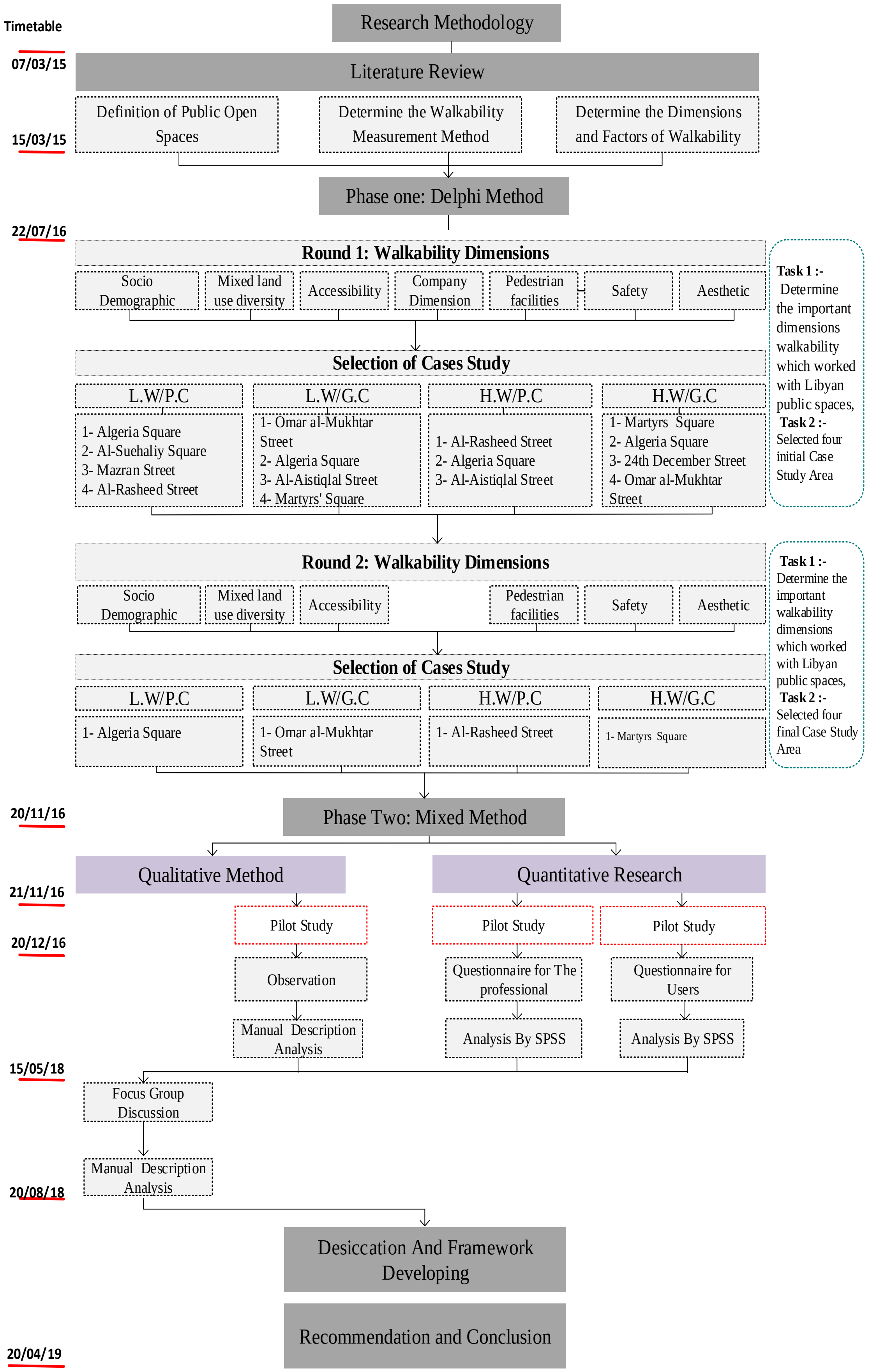
Chapter 7 (Analysis and Results of The Questionnaire for the relevant professionals) presents the quantitative results of phase two, including the data obtained from the questionnaire surveys for relevant professionals. This chapter details and summarises the findings using SPSS for data analysis

Chapter 8 (Assessing walkability in Tripoli's Public Open Spaces: Observation Method) presents the qualitative results of phase two, comprising the data obtained from the observation survey in the four case study areas. This chapter details and summarises the findings using maps, pictures, and observation sheets

Chapter 9 (Focus Group Discussion) presents further qualitative results from phase two from FGDs in the four case study areas. The data was analysed manually.

Chapter 10 (Findings and Discussion) presents the discussion of the research findings based on the data in the context of previous literature. This chapter links the finding of the previous chapters together.

Chapter 11 (Conclusions and Recommendations) summarises the most important contributions of the research and proposes further recommendations and research directions.



L: Law, H: High, W: Walkable, G:Good, P: Poor, and C: Environment Condition,

Figure 1-2 Flowchart showing the research process

Source: Author

Chapter 2

Overview of Public Open Spaces

This chapter deals with the concept, importance and function of POS in cities in terms of configuration and visual and aesthetic aspects. It identifies types of POS in general and introduces those in Libya relative to theory based on the concept of POS, including the urban environment and its relationship to the walkability and pedestrian movement. This chapter also identifies the dimensions and the needs of POS.

2.1 Definition of public open space

The concept of POS has always been central to urban contexts throughout history; human settlement is fundamentally based on POS. Different scholars have seen POS from various aspects, Lynch (1960) defined open space as one of the substantial lands uses that propose to provide functions as 'recreation, community health, contact with nature, social or conservation' within a part of the city. Today, more than half of the population around the world lives in cities. Cities have always varied in size, and have been abandoned in many cases, but generally they were of stable proportion in pre-industrial, agrarian societies. However, since the 19^{th} century cities have become more crowded, and urban open spaces within them have declined (Chen, 2016). In order to conceptualise POS, it is necessary from the outset to define them.

Pradinie et al. (2015) defined the public open space as a 'place to be public', and a 'place to be free'; aside from such general understandings, there are certain institutionalised more associated with de facto POS (e.g. public parks or market places governed by specific civic and national regulations). POS are spaces to which means that all people have the right to use at any time. POS can be parks, playgrounds, trails, waterfront and streets (Floyd et al., 2007; Kim & Nicholls, 2016). According to Askari et al. (2015), well-defined POS should be managed as the places offering an equal right of access to all groups of users, ranging from teenagers to old people with physical difficulties.

Technically, POS concerns human experience and builds on physical and social aspects of the city (Calderon and Chelleri, 2013; Kratochvíl, 2013; Askari et al., 2015). Within the disciplines of urban planning and urban design, there is more attention in studying the relationship between political processes, social and economic and the way POS are provided and managed (Inam, 2002; Thompson, 2002; Schmidt and Nemeth, 2010). Much research has been done by sociologists, planners, architects, geographers, and urbanists. about POS, and one point of consensus is that the ultimate goal of POS is to improve the quality of the outdoor public space and attract more people to use the POS (Zacharias et al., 2001, 2004). Tang and Wong (2008) argue that POS is often viewed as a fundament part of 'public space' which may refer to diverse types of features and physical forms. Previous research has documented the importance of POS for providing opportunities for social interaction, avoiding a sense of loneliness and promoting social life amongst the elderly (Kweon et al., 1998; Yung et al., 2016).

In recent years, research into public open space has become increasingly popular due to fundamental changes in public life and digital technologies, which have fundamentally changed traditional urban spaces. Many scholars and authors have thus tried to determine the specifications of POS from various perspectives, and to identify the factors of successful POS. A pioneering study by Lynch (1960) selected five factors that must be met in POS to ensure its success: vitality, sense, fit, access, and control. Jacobs and Appleyard (1987) suggested that seven objectives are necessary: identity, liveability & and control, access to opportunities, authenticity and meaning, community and public life, urban self-reliance, and an *environment for all* (i.e. inclusivity, and disabled access in particular).

Jan Gehl (2004; 2010; 2011) highlights several design aspects which would encourage using of POS. According to Gehl for any successful POS, comfort, enjoyment and protection are essential parameters. He describes that the time that people spend in places in the city depends on feeling comfortable both psychologically and physically, and if the level of comfort is low, the time people spend in POS will be short. While enjoyment dealing with how users can be pleased the positive aspects of the weather, enjoy the views and vistas, the artistic quality of the design of the POS and its finer details, and also the pleasure of the experience of the landscape (trees, plants and water). Finally, Protection covers on a wide range of protective measures that the place provides to minimise unpleasant experiences, including safety and security, shelter and protection from traffic.

In the same way, the World Organization for Projects of Public Spaces (PPS) tried to develop specifications of successful POS and annexation under four main specifications: uses and activities, comfort and image, access and links, and sociability. Three main factors are related to the effective use of POS, namely users' needs, the quality of the physical features, and the spatial structure of the space (Abbasi et al., 2015). Considering users' needs is the foundation for any well-designed POS, requiring a design that attracts people, facilitates their activities, and encourages them to spend more time in the space while undertaking these activities (Francis, 2003). At the intersection of the academic and policy literature, scholars keenly debate the best ways to shape POS and to understand the ways in which they are perceived and used. Fundamentally (with regard to the policy level), the formation and management of POS depends on traffic, topography, aesthetic design, and uses (Carmona et al., 2003).

2.2 Characteristics of public open space

Gehl (1980) explained the quality of POS in terms of their types of user activities: social, optional, and necessary activities (more discussion has been done in section 3.7.2). However, much previous research has been descriptive on the success and failure of POS shown in three essential qualities: use, activity, and circulation (Project for Public Space, 2005). Nevertheless, three main factors are related to the effective use of POS, namely users' needs, the quality of the physical features, and the spatial structure of the space (Abbasi et al., 2016). Consideration of user's needs is the backbone for any good design of POS. Francis (2003) noted that designs that attract people, facilitate their activities, and encourage them to spend more time when undertaking these activities are optimal, and Kallus (2001) similarly argues that quality relates to usability, with some standards depending on people's needs and perception. If POS fail to meet user needs, regardless of their other qualities (e.g. purely aesthetic or environmental), they fail to be successful as POS (Carr et al., 1992).

2.3 Qualities of a successful public open space

Public open space usually has functional and physical conditions, which favourably or unfavourably influence social interaction, user comfort and security, which attract users. The physical and functional qualities of POS are related to activities, accessibility conditions, physical amenities, location, and the surrounding land uses (Montero-Avila, 2001). As previously stated, sociability, uses, and activities, access, linkage, and comfort and image are the general parameters of successful POS (PPS, 2001). These attributes influence the enjoyment of POS and the social life that occurs in them.

2.3.1 Social use of public open space

Mean and Tims (2005.p 38) wrote that ''different people have different stocks of knowledge; time and money, which together help shape their ability to access different spaces and places''. Numerous scholars have aimed in their publications to discover the qualities of places that make a successful POS. POS encourages people in social interaction, gathering and meeting, and public life is a crucial social binder which enhances social contact and provides opportunities for entertainment and relaxation (Carr et al., 1992). An empirical study of public open space, the Street has Life Project, used time-lapse cameras to record daily patterns in plazas (Whyte, 1980). It was found that high numbers of people in groups are an indicator of best uses in plazas and an index of selectivity, as users decide to go there by their own choice. For instance, the best use of plazas in New York had 45% of users in groups (i.e. 55% were individuals), and the ‘best-used plazas are sociable places. A high number of groups is a sign of excellent use of urban space (Madden & Schwartz, 2000).

In Tripoli, public open spaces are used in several daily social activities, which determine the functional activity, such as human interactions, all kinds of movement, attractions in the POS and details of components and the character of the open space (Al-muntasir, 2010). An example of changing use of POS is given by Tripoli’s Martyrs’ Square. This was originally erected during Italian colonisation and was characterized by a social and political function of proclaiming the dominance of the Italian colonial authorities by being used for military parades, while Algeria Square was designed for cultural use. The Italians enshrined a monumental cathedral in Algeria Square to iterate the dominance of the colonial government and the Italian colonists, which was subsequently appropriated by the Libyan people after independence, and the conversion of the cathedral into a major mosque, as shown in Figure 2-1 and Figure 2-2. Gazelle Square represents a different use, being designed to tie the city axes and open spaces within the urban fabric of the centre of the city of Tripoli (Al-muntasir, 2010).

Figure 2-1 The former Tripoli Cathedral, and Algeria/Elgazayer Square (1960s)

Source: Wikipedia (2016)

Figure 2-2 Tripoli Cathedral (now a mosque) at present

Source: Al-muntasir (2010)

2.3.2 Public open space for everyone

POS is one meaning of the urban environment that is of great importance in daily activities for city's users who live in their local urban neighbourhood. It is embedded in social, physical, cultural, settings and perceptual contexts (Carmona et al., 2003). Likewise, planners and designers must ensure that POS provides justice by designing for different groups of users (Marshall, 2008), Likewise, planners and designers must ensure that POS provides justice by designing for different groups of users such as the elderly, parents with pushchairs, the disabled, family with children, and teenagers (Marshall, 2008). Also, POS should include personal space for everybody; personal space is the distance kept between two individuals to ensure they feel comfortable (Aljabri, 2014). On the other hand, the degree of intimacy in a relationship enables such distances to be smaller between family and friends, and further apart between strangers (Diversity Council, 2008).

Whyte (1980) found that users of mid-Manhattan plazas were on average 60% male and 40% female. Franck and Paxson (1989) highlighted that the features and physical design aspects (amenities that support necessary activities such as shopping, and such as high degree of visual access) may encourage female's use of POS. Above all, successful POS should take into consideration that the family-friendly space should have facilities for the children, the elderly, men, and women.

2.3.3 User needs in public open space

Francis (2003) defined user needs as the amenities and experiences that the public demands when enjoying POS, and user conflicts in POS can develop when user requests are not met, or when there is a conflict between different user groups. POS is ultimately assessed by people (i.e. users) according to whether they meet their needs; this is called place dependence, which leads people to make comparisons and evaluate alternatives accordingly, but which not necessarily about national correlations of place (Stokols and Schumaker, 1981). Carr (1992) added six user needs in POS, including comfort, relaxation, passive engagement (enjoying the scene in POS without participating actively), active engagement (with physical participation), and discovery.

2.4 Typologies of public open space

There are various ways to classify POS, such as size, how people use them, intended function, and location. (Byrne and Sipe, 2010). The grouping of POS into types has been studied from time to time as a designing and planning tool; such gatherings have usually resulted in either a typology or a hierarchy of urban open spaces (Woolley, 2003), however, some spaces are formed informally, due to pressures such as lack of defined POS, urban development, and social interactions.

According to Carr et al. (1992), OPS is one of the important characters of urban structure, covering non-built (open), limited by blocks (closed). Moreover, modern views suggest the need to add other elements of the OPS, such as space above public and private buildings, which creates the visual identity and aesthetic character of cities. Moreover, the types of POS are defined according to their levels of use, their levels of intervention, and their spatial locations, (i.e. from the most undisturbed to the most highly developed), for example public spaces such as squares, streets, and other areas provide high levels of social and cultural functions (Maruani and Amit-Cohen, 2007). Other authors such as Lynch (1981) established a typology for POS that identified regional squares, parks, plazas, adventure playgrounds, playing fields, wastelands and playgrounds.

Tripoli has a unique POS that has developed over time, in response to popular needs and regimes, producing various public parks, streets, and squares. However, some spaces, such as the footpaths of main streets in Tripoli city centre, have developed recently into popular public open space. Its typologies can be placed into categories and subcategories, as shown in Figure 2-3, with three major POS typologies: green, civic, and leftover spaces. The latter could be expanded to include loose fit spaces or found spaces, based on different types of urban open spaces in the city and Libya. This accompanying classification, and categorization is very useful, since it facilitates the identification of criteria for intervention in a particular public space.

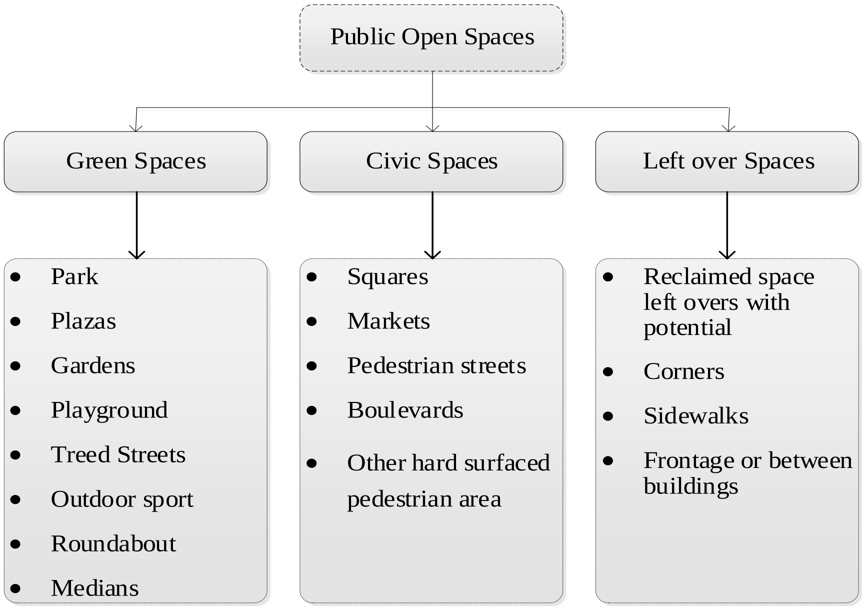


Figure 2-3 Types of urban open space

Source: Francis (2003)

2.5 Streets as public open spaces in Tripoli

The word ‘street’ is derived from the Latin *strata*, which means ‘paved road’. According to the Oxford English Dictionary (2015) ‘‘a street is a public road in a village, town, or city typically with buildings on one or both sides’’. In urban planning studies, scholars have defined streets in many ways, including as a ‘‘linear space lined by buildings, found in settlements and used for circulation and sometimes for other activities’’ (Rapoport, 1987), and as ‘an enclosed, three-dimensional space between two lines of adjacent buildings’ (Moughtin, 1992).

A street is one of the most important components of urban design and city character (Sholihah, 2016). Street design forms city identification, and can distinguish one city from others (Jacobs, 1993). A street is wider than an alley or lane, but narrower than an avenue or boulevard. Without a street, no city can exist, and most cities have in addition squares and parks comprising POS (Kostof, 1992). In urban areas, streets constitute a significant part of the POS and are seen as the most important symbols of the public realm (Jacobs, 1961;

Appleyard et al., 1981; Jacobs, 1995; Lofland, 1998; Carmona et al., 2003; Southworth, 2003; Jalaladdini and Oktay, 2013).

Streets may include residential houses and/or commercial buildings and other structures on one or each side; it has social and economic functions that are integral to urban life (Clos, 2013). Currently, the change in function of streets from multifunctional POS to a non-functional traffic network is arguably one of the most consequential changes to cities and central to this. The significant question is what makes streets optimal POS? Alan Jacobs (1961) opined a practical characterisation, whereby good streets tend to have narrow lanes (making them safe from moving cars), small blocks (making them comfortable), and architecturally-rich buildings (making them attractive).

Intuitively, walking into a shop-lined narrow street is a more comfortable, more exciting experience, far safer than walking down an arterial road between parking lots. However, walkable streets have long been neglected in urban planning, due to the prioritisation of car traffic (Gehl, 2010). Roads designed for cars comprise physical barriers to walkability, and cause noise and pollution in cities (Corbett, 2004). Promoting car-free streets in Europe and changes to the pedestrian movement has enhanced city liveability (Corbett, 2004). According to Gehl (2010), when it comes to preference, safety must come before space. He stated that a single policy of increasing pedestrians and cyclists can certainly generate the interconnectedness between elements: safety, sustainability, health and liveability, as shown in Figure 2-4.

Copenhagen is an excellent example of how promoting walkability can create liveable city space. It is considered the first European capital city to prioritise walkability over traffic. Pedestrianisation began with the city’s main street, which was converted in 1962 into walkable street as an experiment. This was implemented early in the 1960s to create a better environment for customers in the city’s commercial centre. Copenhagen was the first European city to take serious steps towards providing W-POS in its cities (Aljabri, 2014).

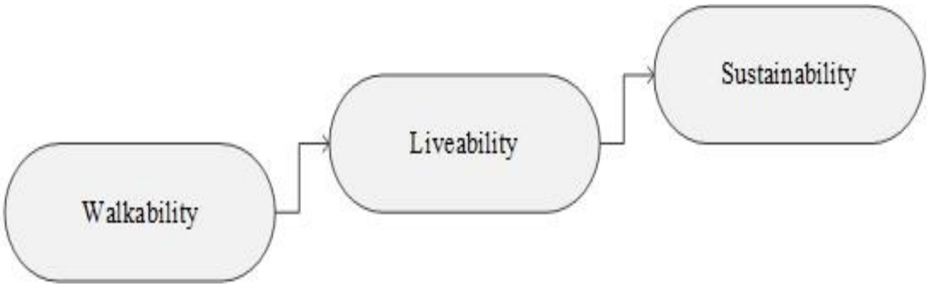


Figure 2-4 Sustainability, liveability and walkability connection

Source: University of Winconsin Transportation Analysis Team (2011)

Tripoli is essentially an Islamic and North African city, albeit with strong European colonial imprints, with many advantages justifying its living and urban quality, but the city also has many difficulties. Firstly, there is obvious weakness apparent in the degradation of the urban space (Lakhder and Dugeny, 2010). Also, some areas are going through degradation; and public spaces such as green spaces have decreased compared to what they were ten years ago. Roads and pavements are in bad condition, and the POS furniture is non-existent or heavily damaged. New projects with lack of design and developing operations bring in architectural elements that harm the city's image (Lakhder and Dugeny, 2010) like the waterfront project. After the conflict of 2011 all maintenance projects were stopped entirely. Previously, there were tentative steps toward a system governing the circulation of traffic, to ensure that the network corresponded with the character of the space and the social requirements of its users (Kiet, 2010) but no implementation was observed during the fieldwork undertaken in this research.

Many characteristics of street users and the ways in which they use POS have been studied by numerous researchers (Jacobs, 1961; Czaenowsky, 1986; Rykwert, 1986; Rapoport, 1987; Moughtin, 1992; Jacobs, 1993; Carmona et al., 2003; Carmona et al., 2010; Gehl, 2007), as described in the following subsections.

2.5.1 Street as social space

Social activities are all activities undertaken by multiple people in the same place at the same time, including interactive activities between users of open spaces. Social space is ‘a constituent part of the ‘public realm’’ (Carmona et al., 2003). Many urban designers and planning scholars like Jacobs (1961), Whyte (1981), Appleyard (1981), Gehl (1987; 2007), Jacobs (1993) and Mehta (2013) have embraced the role of the street as important social space in the city. In the city there are three vital functions of the POS: connection space, meeting place, and marketplace. Streets always function as meeting places in city centres (Gehl, 2007), but other uses are specific, such as military activities. Generally, street space is used in the day and night for strolling, sitting, resting, people-watching, talking, and waiting, which are predominantly static forms of the functions of streets as social spaces.

Some scholars have questioned whether streets are automatically POS, with Carmona et al. (2003, p. 69) noting that ‘‘social space provides opportunities for interaction and exchange, development facing onto it will tend to be ‘socially’ active’’. Predominantly static forms of streets without genuinely social (i.e. interactive) functions are thus not social spaces, such as those with limited movement space has few opportunities for social interaction, resulting in being ‘socially passive’. A network of active and socially vibrant streets is essential for successful POS and cities and communities as a whole (Jacobs, 1993). Streets in Tripoli are used in unplanned and spontaneous social activities, but without any suitable quality of services.

2.5.2 Street as pedestrian pathway

Urban street design was traditionally based very closely on pedestrian movement, but since the mid-20th century there has been a global trend toward traffic segregation from pedestrian movement by urban designers and planners. While pioneering efforts such as those discussed previously in Denmark led to initiatives to reclaim POS and city centres in general for pedestrians, it is only very recently that global attention has begun to shift from urban planning based on automobiles back towards pedestrian users, and the legacy system in most cities worldwide is one of monolithic street design and traffic engineering premised on what is best for cars. This urban ontology views streets as arteries for traffic rather than as places for use as POS, thus realigning modern POS often requires reducing vehicle speeds and planning to facilitate and protect pedestrian movement (Kaparias et al., 2015). In connection with this function, various activities have been identified regarding the use of streets either as channels of movement or for pedestrians (Eichner and Tobey, 1987), as shown in Table 2.1. Finally, understanding the function of a street as a channel of movement must reflect on pedestrian movement, while acknowledging the fundamental necessity for transferring traffic, goods, and services through POS.

Table 2.1 The street as a channel of movement

Street Functional Uses	
Vehicular Circulation	*Pedestrian Circulation*
• Through movement • Picking up/ dropping off passengers • Curb side parking • Access to parking • Buses • On-street service • Off-street service • Emergency vehicle	• Through movement • Waiting for, boarding and alighting from vehicles (buses, taxis, cars) • Entering and leaving subways • Crossing street • Entering and leaving buildings

Source: Eichner and Tobey (1987)

2.5.3 Commercial space

Commercial street activities are the traditional mechanism for the distribution of goods and services in society. Brown et al. (2009) defined the commercial street as a multiple set of small-scale commercial entrepreneurs, working in ‘legal or socially acceptable goods or services who trade from the street, informal market or other publicly available space (whether publicly or privately owned) but whose operation takes place at least in part outside the prevailing regulatory environment'.

In Tripoli Libya, streets such as Omar Al-Mokhtar Street, Al-Rasheed Street, and Mazran Street are used as commercial spaces. Shops proliferate in those streets as places for trading, but numerous other forms of economic-based informal street activities also radiate from this commercial core, such as street vendors, who also take part in the street space and its social life (Almuntasir, 2010).

Figure 2-5 Al-Rasheed Street as commercial spaces

Source: Author

2.5.4 Street as cultural space

Culture is in many types of 'businesses' of cities (Zukin, 1995). Local commercial streets (shopping streets) are simultaneously sites for cultural exchange, social, and economic activities. Shopping streets in city centre are a ‘‘face' for local social and cultural identity, as described by Zuking (2012):

> 'They do this through the small scale of social interactions; by the rootedness of individually owned shops in local economies; and by the on-going cultural

> negotiation, on the part of store owners, customers, and habitués, of two cardinal principles of urban life: familiarity and strangeness'.

While more recent analyses see cultural aspects of as secondary outcomes of primarily economic function, classical analyses saw culture as the main foundation of the use of streets by pedestrians (Rapoport, 1987), citing the deeper significance of streets manifest in their periodical conversions into spaces to do performances, parades, or plays as the new street in Birmingham. Pedestrians often celebrate their success, identity, or essential occasions along the street space through street parades and processions. During private and public occasions, streets can be settings for events such as weddings, funerals, or national celebrations. Streets play an important role in Libyan architectural, daily, and political culture, for example, Omar Al-Mokhtar Street contains an architectural history of Tripoli's cultural diversity, reflecting Moorish, Turkish, Italian, and modern building styles and motifs.

2.6 Squares as public open spaces

Civic centres, plazas, piazzas, and public squares are all forms of POS in urban areas (Talviste, 2010). Classical town planning on the Greco-Roman model was based on a central forum, a POS functioning as a marketplace and meeting place near to the civil (governmental) centre and temple, which remains the standard format for urban planning today, reflected in Italian *piazzas*, German *platz*, French *place*, Spanish *plaza*, and English *square* (Neal, 2010).

The square is produced by the grouping of buildings around an open space (Krier, 1979). Moughtin (1992) defined a square or plaza as both an area framed by buildings and an area designed to exhibit its structures to the greatest advantage. The square is identified as one of the most ancient forms of open space; consequently, it is usually found in the centre of towns or cities and is one of the most significant elements of city design (Woolley, 2003). Squares are generally spaces with hard-landscaping in mostly public, open areas (Moughtin, 2008). While there are regional variants, square POS universally include a large, open, and paved space, anchored at the centre by a monument, fountain, or another architectural feature. The precise characteristics depend on the design of the space itself and the activities performed there by users, and the heights of enclosing buildings and their ground floor functions and aesthetics (Lang, 2005).

In modern European cities squares have returned as liveable, opulent spaces hosting various activities, and besides their commercial and leisure functions, they attract tourists as features of cities in their own right, such as Piazza San Marco in Venice or Trafalgar Square in London. Squares can become venues for pop and classical musical events, sometimes raising money for charity, or hosting democratic protests (Woolley, 2003). A desire for a vibrant public realm and urban liveability must acknowledge the need to provide urban squares as important POS.

Globalisation, colonisation, modernisation, westernisation, and various demographic in MENA have created transformations and produced new contemporary cities (Aljabri, 2014). MENA community cultures combine social, religious, and traditional values with modern lifestyles, using Western forms of open spaces, such as monumental squares, but they do not necessarily function successfully as POS in such contexts due to social, economic, and environmental differences (Aljabri, 2014). Cities like Tripoli, Benghazi, Darna, Murzig, and Ghadamis still contain parts of their old quarters, which are characterised by their fine-grain patterns of streets and low-rise buildings, and are marked by their mosques, castles, indigenous public squares and courtyard buildings (El Mahmudi, 1997).

Figure 2-6 Martyrs' Square as Public Open Space

Source: Amir Abu Sen (2009)

2.7 Dimensions of urban open spaces

In urban design theories, space can be analysed in terms of visual, perceptual, or social perspectives. Lynch's (1960) approach examines the physical environment to obtain the perceptual structure of urban space. He defined several physical elements that constitute the legibility and imageability of a city. Hence, Lynch's theory of urban fabric is based on the society's mental image of their city. Furthermore, Krier (1979), describe urban space as all space between buildings, which will 'consciously be perceived as urban space' when there is 'clear legibility of its geometrical characteristics and aesthetic qualities'. Through this definition, Krier's concept of urban setting leans more towards the physical structures rather than the uses to which POS are put by users.

However, some longstanding theoretical perspectives on urban design have long focused on the human dimensions in creating public spaces, including 'needs, rights and meaning', studying 'the interaction of peoples and places and how this affects the ways settings function' (Carr et al., 1992). To create a comprehensive understanding of the urban structure, it would be a practical approach to combine all the areas in analysing urban structure into a unified framework. Carmona et al. (2003) organised and analysed information on urban design and combined the synthesis into an interconnected framework; the Carmona urban design dimension framework is hereinafter referred to as 'the framework'.

Hawkes' Hawkes (2003) acknowledged that Carmona et al. (2003) collected and organized an enormous volume of information concerning history, theory, and practice to define, describe, and inform 'the nature and processes that currently constitute the field of urban design', and he agreed that this theory was 'applied effectively' to clarify the 'inherent complexity' of urban design in an 'objective, descriptive and analytical' way, making it a useful tool for practitioners. However, he cautioned that there are 'more dimensions that defy the calm logic and systemization of this approach', referring to the deeper and theoretical insights of the city such as the 'dimensions of life'.

As discussed above, the dimensions which form the main framework of this study are adequately practical to understand a city structure with clarity. Although it is stated that there are other dimensions of an urban setting, this study has already outlined their limitations. The dimensions of urban design could be categorized into six distinct elements: morphological, perceptual, social, visual, functional, and temporal (Carmona et al., 2003, p. vii). These dimensions help in placing the case studies into an urban context and understanding how the dimensions have an effect on the vitality of the public spaces.

The fast-paced urbanising of cities requires clear guidelines to ensure the consistency of the design value. Hence, public spaces within an urban setting also require careful analysis to design POS in societal solidarity rather than being fragmented as a result of privatisation of activities. Three of the main urban design dimensions are studied in this section.

2.7.1 Social dimensions of urban open spaces

The term 'social' is identified as 'of life or a way of living: characterised by association in groups or communities' (Oxford English Dictionary, 2015). Accordingly, the meaning of the social dimension in urban design is regarding the 'relationship of the space and the social/urban experience'; Carmona et al. (2007) also stated that 'the physical environment has a determining influence on human behaviour'. Hence, urban design can be viewed as a tool for manipulating the outcome of human behaviour within its context. This indicates that an urban space needs to fulfil human needs to increase users of the POS.

Jacobs (1992) used the aspects of mixed-use activities. She agreed that in a thriving city street there must be constant traffic of pedestrians at different times of the day. To achieve this, the district must have a mix of primary functions to attract pedestrian to walking into the public realm of the city in different schedules and purposes. It is evident that designing an environment with different activities will promote the vitality of the area, indicating how the appearance of the city influences the patterns of human activities.

2.7.2 Visual dimensions of urban open spaces

The visual dimension is purely focused on the aesthetics of the space. Ultimately, a city is perceived by the 'faculty of sight, for it is almost entirely through vision that the environment is apprehended' (Cullen, 1995). The visual elements can be categorized into appearance, bulk, scale, massing, amenity style and development size (Carmona et al., 2003). Consequently, a city can be visually attractive when all the visual variety such as nature, blocks (buildings), traffic and so on are weaved together 'in such a way that drama is released. The visuality of a city can be considered as 'serial vision' as a result of human movement. Hence, a visually successful city will have a dynamic tapestry of elements that can invoke the sense of curiosity and encourages people to explore the city further like the streets in Barcelona, Spain.

2.7.3 Functional dimensions of urban open spaces

The functional dimension in urban design involves 'how places work and how planners can make "better" places'. A functional space will be 'able to serve the need of the users', which include five primary needs: 'comfort, relaxation, passive engagement with the environment, active engagement with environment and discovery' (Carmona et al., 2003). There are two segments of the functional dimension: 'social usage', which involves the relationship between people and the functioning of the environment; and the 'visual' tradition, which involves technical criteria such as traffic flow, access, and circulation (Carmona et al., 2007).

In conclusion, the functional dimension relates to the design considerations that have been implemented to create an environment which is conducive to the everyday life of society. This could be in the form of infrastructure, environmental factors, safety measures, and so forth.

2.8 Public open spaces in Libya

To better understand Tripoli's POS, it is critical to look at the history of urban planning in Libyan history cities. Historically Libya has been controlled by numerous civilizations, including the Phoenician, Carthaginian, Greek, Roman, Vandal, Byzantine, Arab-Islamic, Ottoman and Italian cultures. As a result, urban planning and the form of most Libyan cities is deeply influenced by external ideologies and planning methods from foreign countries (Abubrig, 2012).

Modern city planning started in Tripoli within the second Ottoman era (1835-1911) and reflects the styling reforms undertaken throughout the Ottoman provinces. These included the provision of water taps to the public, farmyard care system, erecting a telegraph system among the major regions, the city landscaping, and municipal reforms to specialized construction operations, and developed city planning particularly to plan urban growth beyond the traditional medina walls. The second Ottoman period also built several buildings belonging to facilities outside the old city, such as camps, hospitals, and public buildings (e.g. the School of Islamic Arts and Trades), as well as street lighting (Ali, 1998; Zidan, 2014). Figure 2-7 shows the location of the city and its port in 1746, and the area of the city inside the walls connected to the port (Attwairi, 2015).

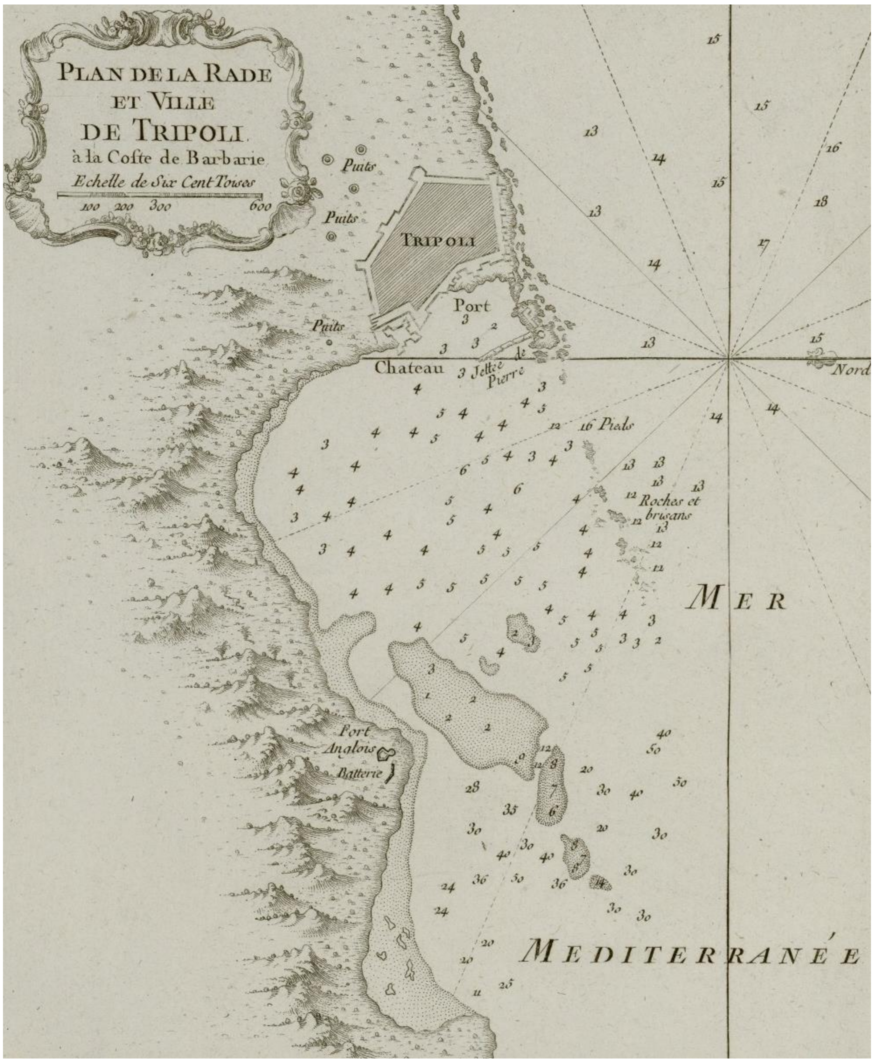


Figure 2-7 Map of Tripoli in Jacques Nicolas Bellin's 1764 atlas

Source: Attwairi (2015)

Tripoli continued to grow and expand throughout the Italian occupation, which ended in 1942, during which it underwent a significant transformation based on Italian city planning. The Italian government spent about 50 million Libyan pounds during the thirty years of occupation developing utilities and public services for Italian colonists (Farley, 1971). The Italian control designed the Tripoli plan according to European urban planning and design principles, which transferred the city to be a large urban centre with a modern well-planned business centre outside the old city walls. Figure 2-8 shows the map of Tripoli in the Italian occupation period, with very-well organised land uses based upon planned streets and roads, which represents the European design of urban planning. For instance, there is a distribution between religious uses based on each group, Christians, Muslims, and Jews, with each group having its religious facilities, including places of worship and cemeteries (Attwairi, 2015).

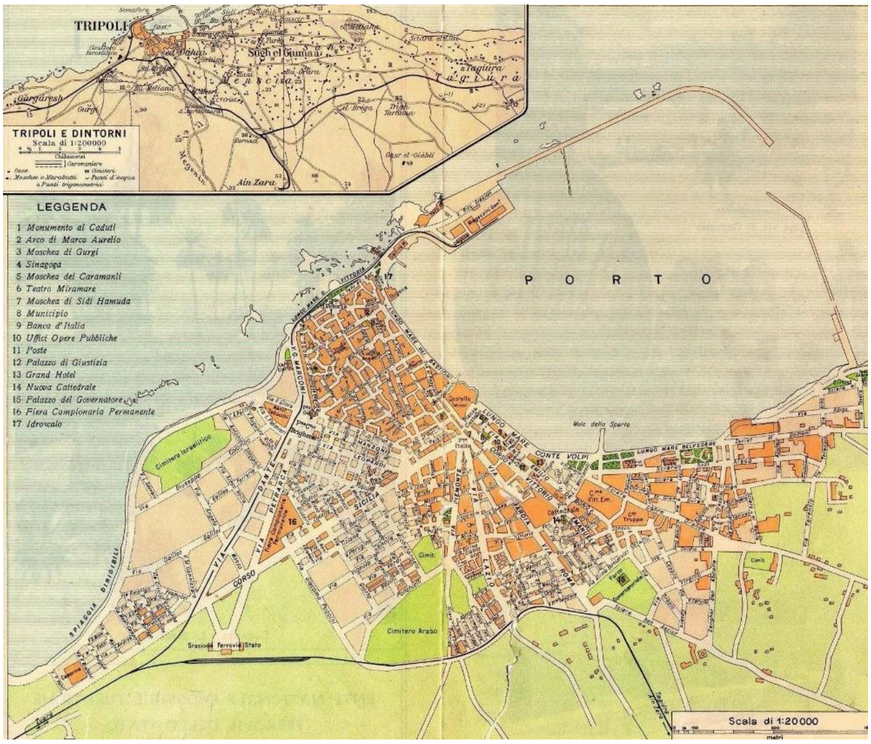


Figure 2-8 Map of Tripoli in 1940

Source: Attwairi (2015)

The new part of Tripoli designed and built during the 1940s was called the British Garden City (Libya was controlled by a British Mandate following liberation by the Allies). This provided new types of single-family houses as an alternative to the urban residential blocks of the Italian Quarter and the courtyard houses of the Old Town, as shown in Figure 2-9 (Remali et al., 2015). The Garden City was designed as urban fabric of the quiet, purely residential environment, with the majority of plots interfacing with the street through blank walls or fences that concealed private yards from passers-by. In the same way, the Garden City planned as sizeable mono-functional housing zones served by commercial centres located on the edge of the neighbourhood. This model reduced the compactness of the fabric, and the traditional identity that characterised both the Old Town and the Italian Quarter.

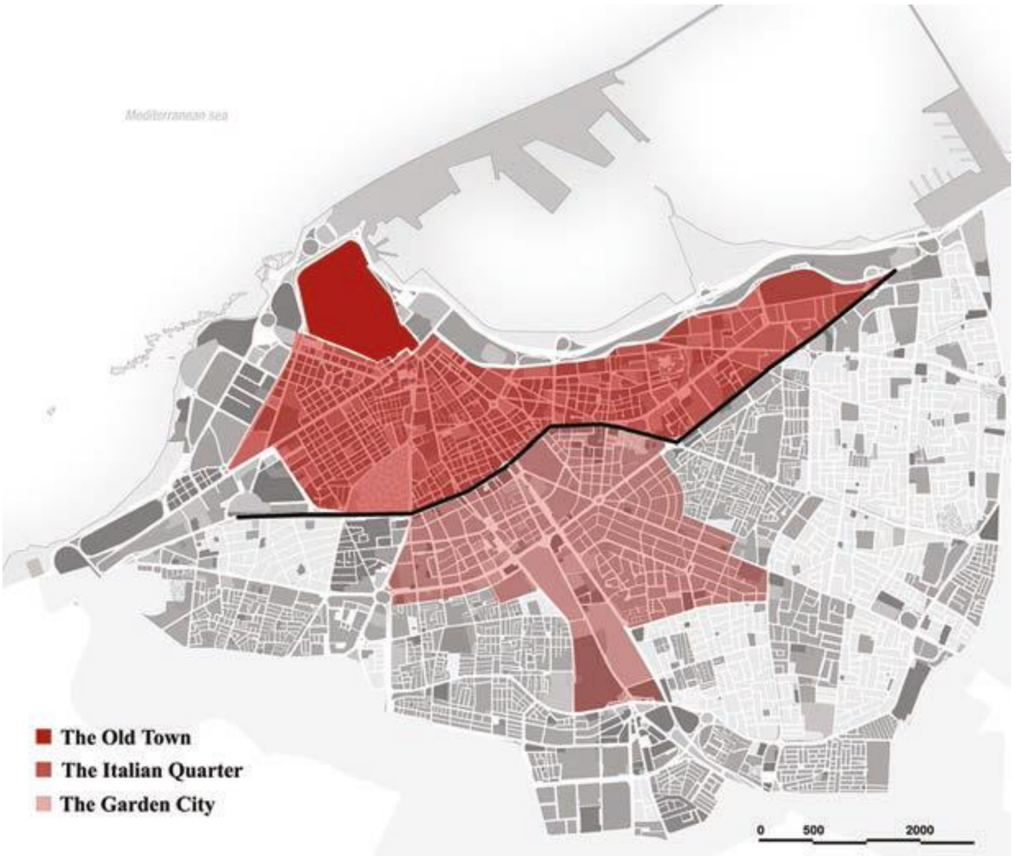


Figure 2-9 The three-character areas in Tripoli's city centre: Old Town, Italian Quarter and Garden City

Source : City Images et al (2015)

The reality of the Libyan city today shows that there is a poor relationship between user requirements and POS within the city, particularly in terms of the most important parts of the city centre (public squares and streets). The public squares (e.g. Algeria Square and Martyrs' Square) and streets (e.g. Mazran Street, Omar Al-Mokhtar Street and Rasheed Street) reflect the original concept of the urban open space, and have a role in enriching the city socially, economically, and politically. The Tripoli region in northwest Libya is a case of explosive urban growth and urban poverty, which has become an emerging problem for Libya cities in general. Although Libyan policy allocates land for Open Space, it is not provided most of the time due to lax enforcement and other issues (Addas, 2015).

POS differ in their particulars in Libyan cities, reflecting different local traditions and government personnel, as well as prevailing urban planning, design theories, and practices, but since 1968 two main planning schemes have been applied in Libya. The First-Generation planning phase was issued for the era 1968-1988 but ended in 1980. Master and layout plans for the more essential towns and cities were prepared. The early termination of this planning program was due to the social changes and dramatic economic that took place during the late 1970s. The authorities concerned therefore concluded that the re-evaluation of the existing plans was needed (Azlitni, 2005). The followed Generation planning phase covered from1980 to 2000 and included the elaboration of the following plans (National Physical Perspective Plan, 1979; Azlitni, 2005):

- The National Physical Perspective Plan, 1980-2000
- Provision of regional development plans (i.e. Tripoli, Benghazi, Al-Khalij, and Sebha regions)
- Preparation of 18 sub-regional plans covered all administrative areas
- Preparation of 244 urban plans consisting of:
    - Master plans
    - Layout plans and plans for more important settlements

In 2006, tackling these problems of deterioration and decline in social housing and open spaces areas was seen by the Libyan central government and their consultants as a way to fight unpleasant urban sprawl and slums, though they focused only on tackling the physical problems, and their plans were not supported by professional urban design. The planning authority started these projects, which were awarded to local architectural firms (Azlitni, 2005). New master plans were designed from the local practices without any supporting research documents or guidance, and the government method and practice of POS and urban design remains by far underdeveloped, despite international progress in the field and the extensive resources available to the Libyan government (Azlitni, 2005). Most Master Plans in Tripoli designed the POS as spatial land use, because of a poor collaboration and systematic understanding of the characteristics and patterns of urban open space. Planners frequently fail to consider the most critical social, ecological, and environmental roles of POS while formulating planning strategies. Thus, while the Tripoli master plan allocated open spaces, they were not actually provided most of the time (Alzklaa, 2016).

Tripoli, as the biggest city in Libya and its capital, currently faces many physical and social problems resulting from rapid development without concentration from the local authorities and producers. Ali et al. (2011) reported that the Tripoli region as a whole has no comprehensive master plan, and this situation has facilitated arbitrary urban sprawl. Over recent decades Tripoli has been one of the most rapidly growing cities, irresponsibly and thoughtlessly changing city structure, land cover, and uses (Ali et al., 2011). By 2005 over three-quarters (77%) of Libyans lived in cities, which is usually considered a sign of socio-economic progress, but which can be seriously problematic when not managed properly in an integrated approach including diverse aspects ranging from urban planning, infrastructure investment, health and education, waste management and food security (DESA, 2014). The essentially ad hoc nature of urbanisation and urban development (i.e. sprawl) in Tripoli has resulted in many urban problems which explain why Libya has not performed well in its experience of urbanisation compared to countries comparable to it in the 1980s (e.g. Lebanon, Canada, and South Korea) (Ali et al., 2011).

Furthermore, the regulations of land use applied since the 1990s preclude overcoming most of these difficulties. Many open spaces and streets which were originally intended for pedestrians have been destroyed under these regulations (Lakhder and Dugeny, 2010). Also, the crisis in Libya now has helped the rise of crime, as well as spread illegal phenomena, such as parking on pedestrian footpaths and selling merchandise in the street. Additionally, the lack of clear pedestrian's pathways from Martyrs' Square to OMS and the mix between the vehicular traffic and pedestrian movement does not improve the comfort or aesthetic enjoyment of the central area (Abdulla et al., 2016; Alzklaa, 2016).

2.9 Summary

POS and the dimensions of POS were defined and presented in this chapter, which also reviews types of urban open spaces that may be can find in Tripoli Libya. Culture aspects of human use and their influence on the experience of POS were also observed. The main conclusions are that the number of people is but one index of urban development, and the success of the urban space depends on its actual uses by inhabitants. Considering its importance, studies linked the level of activities in a POS with the Libyan culture as well as Islamic culture (e.g. with regard to particular concerns about privacy and gender) and show that successful use of POS is generally possible only when necessary preconditions are met.

Chapter 3

An Overview of a Walkable Public Open Space

This chapter explains the characteristics of walking and walkability, focusing mainly on walking purposes, factors influencing users to walk, walkability measurements, research approaches of walkability, the benefits of walking and walkability, and finally walking and walkability situations in the global, regional, and national contexts. The chapter summarises the lessons and challenges drawn from different countries concerning the walking environment. This chapter is directed to explore the concept of walkable POS, and to survey extensively existing literature in English language/ Arabic language on the transfer of developed countries best practices of walkable POS (W-POS) in developing countries; and (2) to determine the tools to measure walkability in POS from the literature.

3.1 Definition

It is essential to clarify from the outset what exactly is meant by walkability and W-POS. Many urban designers have used the concept of walkability in relation to accessibility, comfort, proximity, and suitability, but it is essential to establish an operational definition for this study. Jane Jacobs (1961) defined walkability as the core of urban vibrancy, and vitality with, density, the mixture of short blocks, land use mix and building types creating a ‘pavement ballet’ in which the residents and visitors of the neighbourhood exist (Jacobs, 1961). Walkability is frequently linked with suitability elements such as street landscape (hard and soft), pedestrian pathways, street furniture, street width, safe speeds and crossing improvements (Gilderbloom et al., 2015). However, Rafiemanzelat, Emadi, and Kamali (2017) argued that walking is different from walkability, defining walking as “short distance moving from one point to the other point. While walkability is a concept which is known as measurement of the pedestrian-friendly’s degree of an area, also walkability pertains to the physical environment in which walking takes place”.

‘Walkability’ is a comparatively new term in academic research and is only understood in a general way in everyday language. The most inclusive definitions found in the literature describe walkability regarding walking condition attributes such as convenience, comfort, and safety (Litman, 2003). On the other hand, Abley (2005) illustrated that, walkability as “the extent to which the built environment is friendly to the presence of people living, shopping, visiting, enjoying or spending time in an area”, which reflects the contemporary definition of walkable space. In strategy terms, walkability has been understood as the extent to which walking is readily available as pleasant mode of transport, a safe, connected and accessible (Mayor of London & Transport for London, 2004). While, Southworth (2005) defined it as to which level the built environment supports and encourages walking by providing for users’ comfort and safety, connecting people with various destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network.

The term walkability broadly used with the economic benefits, providing social benefits and sustainable city, mostly in contexts where walkable spaces are the only access people have to healthy outdoor activities. Furthermore, walkable places provide life to city centres, and liveable POS contribute to safer urban environments. In transport terms, walkability is the most sustainable mode of transport with the least impact on the environment (Frank et al., 2005; Abley and Turner, 2011). However, safe infrastructure for non-motorized transport such as cycling and walking, accessible and affordable public transport service are lacking in most developing country cities (Moura et al., 2017).

Regarding on these perspectives, Forsyth (2015) gathered walkability under three key dimensions: perceived outcomes of walking (lively and sociable, sustainable transportation options, and exercise-inducing); the community environment (physically enticing, traversable, compact and safe); and as a proxy for better design (multidimensional and holistic solution). The concept and terminology of W-POS is alien to the Libyan Interests of

Urban Planning (2009), which does not conceive of walking beyond rudimentary pedestrian pathways. Conversely, many authors consider walking as the aim of all POS (green spaces, public squares or yards, pathways, and walkable street) allocated for walking with accessibility, safety, pleasure, and comfort, including in terms of playgrounds, street activities, and sports facilities.

3.2 Types of walking purposes

According to reviewed literature there are two fundamental reasons behind walking: people walking because of transportation or/and walking because of leisure/recreational (exercise, recreation, leisure, shopping, spiritual rejuvenation, social interaction, & the cafes/restaurants, etc.) (Paulo, 2012; Zuniga-Teran et al., 2017). Moreover, Gehl and Gemzoe (2001) and Gehl (2004) categorised walking according to walking purposes as necessary, optional, or social. People walk for various reasons. For example, making short movement, shopping, and going to work or school (Schmeidler, 2008). In the USA, national estimates indicate that roughly 42% of adults walk during leisure time, and 28% regularly walk for transportation purposes for periods of at least 10 minutes (Kruger et al., 2008). Considering the inadequacy of previous studies on the relevance of reason for walking in particular places, and this study’s focus on Tripoli, it is essential to determine the reasons for walking in city centres.

3.2.1 Transportation

The popularity of automobiles in the US during the 1920s and their subsequent global proliferation during the mid-20th century led to their ubiquitous use as the primary modern transportation vehicle, with most cities worldwide being designed around cars from the 1950s onwards (Ghadimkhani, 2011). Correspondingly, public transport and urban walkability became less apparent as significant priorities of transport planning and urban design (Singh, 2016). Nowadays, about 5-10% of automobile journeys could be replaced by non-motorized transportation, such as walking (Mackett, 2000). While driving is generally chosen for convenience and comfort, modern congested cities increasingly pose many disadvantages for car users, such as parking problems and expenses, negative land-use impacts, traffic congestion, environmental damage, and air pollution (Abdulla et al., 2016).

Due to the increasing urgency of the need for environmental sustainability, both at the macro level of global climate change and the micro level of urban air pollution, walking is again becoming recognised as an essential mode of urban transport. Walking is the most important mode of sustainable transportation and remains the main de facto mode by which humans move from one place to another (e.g. between rooms in a building) (Craig et al., 2003; WHO, 2013). Walking is also the cheapest way of transportation and constructing a walkable community can also facilitate an improved and affordable transportation system. In the same way, walking is a means of moving around in areas that cannot be accessed by cars (UN-Habitat, 2013).

Most cities in developed countries have been gradually redesigned to accommodate various modes of transport, including cyclists and pedestrians alongside motorists, with vehicular preference for public transportation (e.g. bus lanes, or the exclusion of private vehicles at certain times of day) and sharing cars (e.g. car pool lanes) (UN-Habitat, 2013). Also, the current discussions in many developed countries focus on promoting walking as a major non-motorized means of transportation (Krambeck, 2006). However, facilitating walking for transport is similar to the movement of traffic, with little or no consideration given to the physical environment or the context of the trip being undertaken; in other words, increasing pedestrian access functionally does not equate with walkability per se (D’Arcy, 2013).

Driving is the primary mode of travel in Libya, replacing more active forms of transportation like walking, bicycling, and public transit. As mentioned previously, car use has increased exponentially in Libya since the 1980s (WHO, 2015, p. 11). There are many factors involved in this, but unlike in developed countries there are substantive barriers to walking in urban spaces, including infrastructure, such that using private vehicles or taxis is the only expedient way in which to gain access to POS.

3.2.2 Pleasure, leisure, and recreation

Recreational walking is the second primary type of walking, and it can be divided into the categories of walking for leisure and walking for exercise. Recreational walking for pleasure is associated with observably different behaviour from more necessary walking activities, such as walking for transport (Choi, 2013). Walking for pleasure usually involves moving at a slower pace, often with another person, and seeking out particular spaces such as green parks, shopping streets, and city-centre POS (Duffy, 2009). Nowadays, walkability research focuses on improvement measures that encompass more of the pleasure, leisure, and recreation aspects of walking (Badoe and Miller, 2000; Crane, 2000; Ewing and Cervero, 2001, 2010; Cervero and Duncan, 2003; Saelens et al., 2003; Handy et al., 2005; McMillan, 2005, 2007; Heath et al., 2006; Leck, 2006; Saelens and Handy, 2008; Cao et al., 2009; Pont et al., 2009).

Rapoport (1987) argues that walking for pleasure is influenced by the physical characteristics of the urban environment, as it stimulates exploratory activity and is related to the potential functions of pleasure, interest, exploration, behaviour, delight, and the like. Moreover, people will take their time walking for pleasure due to the values of aesthetics, scenery, and comfort in POS. When one has a choice where to spend leisure time, the attractiveness of the environment is much more important than utilitarian uses (Smith, 2008).

In developing countries there is a lack of W-POS infrastructure, and the available POS are inadequate for the ever-increasing urban populations (World Bank, 2011). In recent years in Libya the lack of financial resources and administrative capacity to maintain the POS infrastructure and essential urban services further makes the situation hopeless (Abubrig, 2013). Indeed, the lack of research (English Language/ Arabic language) on walkability within the context of developing countries and the scarcity of data on the topic in Libya has been a challenge for this study; also, the unstable political and security situation in Libya was another a challenge for the researcher as well as urban planners in Tripoli. Finally, this study focuses on the second case of walking types (walking for pleasure); with study the first type of walking (walking for transportation) in some parts of the research.

3.3 Walkability in developed cities

In order to understand the current production of W-POS, it is useful to look at different cases around the world. Furthermore, in many developed countries, walkability is regarded as a measurement of how many people are walking in the city to do a daily activity such as working, visiting, shopping, or enjoying the place (UN-Habitat, 2013). Most research about walkability has been conducted in Western countries, motivated at first by the sustainability goal of encouraging pedestrian over car-based urbanism, and now regarded as a key factor in the promotion of communitarian, health, and economic goals (Mack et al., 2017).

In most cities, particularly in the developed world, in which private cars are the primary transportation method, people avoid walking in those cities' centres. In other words, people walk in cities when they *have* to, not because they *want* to (Gehl and Gemzoe, 2003; Darker et al., 2007; Burden and Litman, 2011). Gehl and Gemzoe (2003) categorised cities into four different types: traditional, invaded, abandoned, and re-conquered. They provided physical characteristics and some examples of cities falling under each category to give more understanding of how the urban pattern and its characteristics determine the level of walkability or automobile dependency in each city, as explained in Table 3.1

Table 3.1 City categorization based on physical characteristics

Traditional
Cities are sites for meeting places, market places, military parades, and religious processions and events etc. Streets are functional for foot traffic and public squares are designed for community gatherings. The dimensions and distribution of uses along streets and squares, the scale of cities, and the detail and scale of buildings are in harmony with human proportions and opportunities for movement, and support daily pedestrian movement
Invaded
In urban areas where car traffic has gained the upper hand public spaces are changed radically. Car traffic and parking commandeer space along streets and even pedestrian walkways, dominating the area completely. With the addition of other restrictions and irritations such as dirt, noise and visual pollution, city life is aesthetically and experientially unpleasant.
Abandoned
Where urban tradition is weak and car culture has had ample time to develop without planned constraints, a new type of automobile-based city develops, with no historic model. Pedestrian traffic is obsolete and barred by car-based infrastructure; activities associated with foot traffic in public spaces have disappeared completely. Many city centres around the world are a sea of asphalt with parking between buildings. Walking is impossible and unreasonable. Distances are too great and the only things a pedestrian might encounter are ugly, dirty, and possibly dangerous.
Re-Conquered
Some cities have reintroduced walking in public life, such as Copenhagen, Portland (Oregon), Barcelona, Strasbourg, Freiburg, Lyon, Curitiba (Brazil), Melbourne, and Perth.

Source: Gehl and Gemzoe (2003)

The majority of efforts concerning walkability and walking in cities were conducted in the US and Australia (Jacobs, 1961; Cook, 1980; Buchanan, 1988; Gehl, 1989; Dishman & Sallis, 1994; Sallis and Owen, 1999; Saelens et al., 2003), despite pioneering practical applications being made in some European cities (e.g. Copenhagen), as discussed previously. Most European research about walkability have either used only self-reported physical environmental perceptions or included relatively small sample sizes (Dyck et al., 2010).

More recently, research has begun to emerge from policy studies of walkability in European contexts, often produced by local authorities and municipalities in European cities seeking to explore the feasibility of reorienting existing cities toward walkability instead of automobile dependence. For example, the Transport for London (2004) report *Making London a Walkable City* characterised a walkable city as being connected, convivial (friendly, lively, and enjoyable), conspicuous (attracting notice or attention), comfortable, and convenient. The mayoral vision was to make London one of the world's most walking-friendly cities by 2015 by achieving six objectives:

- Improving coordination and walking plan development – co-ordinating delivery and further developing the plan dynamically, responsive to pedestrian's needs.
- Promoting walking – educating and informing the public, via published materials and campaigns.
- Improving street conditions – drawing up guidelines, developing integrated pedestrian networks and delivering improvements.
- Improving developments and interchanges – establishing guidelines and measures to improve pedestrian conditions at new developments and interchanges.
- Improving safety and security – implement safety and security measures to help pedestrians. Plan delivery and monitoring – the implication of funding and resource input at the regional and local level (Transport for London, 2004).

Similarly, the New Zealand Transport Agency (2009) publicised a summary of four concepts for pedestrian environment improvement: pedestrian precincts, living streets, shared zones and sharing the main street. The principal street adaptations were recommended for strip shopping centres alongside existing roads, which were found to be better value for money in improving safety compared to residential area traffic calming.

A more measurable and concrete plan was put forward by the Dublin National Transport Authority (2008) in the *Greater Dublin Area Draft Transport Strategy 2011-2030*, which sought to make the Greater Dublin Area a recognised city-region for walking and cycling with an attractive and peaceful environment designed around pedestrians and cyclists (National Transport Authority, 2008). The Strategy put forward a multi-pronged approach to walking, including:

- Improvements to footpaths.
- Reductions in pedestrian delays when crossing streets.
- New and enhanced leisure walking routes.
- Appropriate planning to provide walking opportunities and pedestrian-friendly developments, and provision of walking design advice for a local authority engineers, planners and private developers.
- Better information on walking and communicating its benefits.
- Enforcement of traffic laws against offences that impede pedestrian movement.

A more comprehensive vision including a theoretical vision as well as concrete proposals was expounded by the Government of West Australia (2007) initiative *Walks WA: A Walking Strategy for Western Australia (2007-2020)*. The strategy noted that to support the street environment to be walkable five dimensions need to be considered:

- Access and accessibility: Creating easy access to streets by way of walking for everyone, as well as ensuring the availability facilities that can support for the elderly and the disabled.

- Accessibility: space should have a permeable level of flow or ease of access, regulated through physical barriers, convenience and accessibility to a landscape (White, 1990).
- Aesthetics: The need to create an environment gives a pleasant experience in the location, by providing attention to the arrangement of the landscape, as well as control over waste management.
- Safety and security: Pedestrians must feel that they and their belongings safe from acts of crime. Furthermore, Pedestrians should be able to enjoy the trip in a relaxed fashion, in an environment maintained by adopting design principles that can prevent crime. In practice, measures that design the street for pedestrians include pavements, raised medians, better bus stop placement, calming traffic measures, and treatments for disabled travellers, all of which improve pedestrian safety (Southworth, 2005).
- Convenience/comfort: Pedestrians should be able to comfortably walk the streets, with facilities such as public benches and shelters as well as drinking water facilities.

The first three dimensions indicate the eases of walking in a zonal scale, and the parameters are quite quantifiable. The fourth parameter is based on the dimension of local users based on some behavioural issues in walking time. The last dimension is a micro-level approach for improving and strengthening the walking pathways with appropriate instruments.

Muhlbach (2012) has shown that in many developed countries, walking is increasingly promoted due to prevalent chronic conditions like diabetes, asthma, and obesity, causing health concerns to direct public policy on walkability (rather than pure urban planning based on traffic management, architectural, and engineering considerations). In the US in particular obesity has been a major motivator for the adoption of the concept of walkability, in order to increase the overall quality of life for residents and make communities healthier by promoting physical activity by enabling and facilitating walking in existing POS. Krambeck (2006) argued that the discussions of walkability in the developed cities may also focus on changing the system of transportation from motorised to non-motorized for short trips or as a healthy leisure activity, as well as for environmental reasons, the latter of which may be more instrumental in European cases.

3.4 Walkability in developing cities

Developing cities are generally growing faster than anywhere else (Parnell & Pieterse, 2014), usually with less per capita income and poorer infrastructure than in developed countries, associated with many problems for urban systems, inhabitants, and economies. According to Nantulya and Reich (2002), between 55% and 70% of all road traffic deaths are in the developing world. On the other hand, walking frequently represents the primary mode for half of all transportation trips in developing countries, but this is mainly associated with rural poverty rather than an enlightened approach to urban living, and cities in developing countries are generally characterised by heavy traffic density and low walkability and pedestrian spaces (Lo, 2011; UN-Habitat, 2013; Lukenangula, 2017).

Despite the expediency, cost efficiency and common sense of promoting walkability, governance, urban planning, and lifestyles in developing countries, including Libya, continue to be based on a drive toward automobile transport, heavy urban density, and reduced quality of life in urban areas, and transport policy in particular is fundamentally oriented toward more cars and more roads (Schmeidler, 2008; Abdulla et al., 2016; Lukenangula, 2017). Consequently, there is a lack of pedestrian facilities, comfortable facilities, and public services (e.g. public toilets) for walkability, thus walking in developing countries is not strongly associated with walking for leisure and pleasure, rather it connotes arduous and grinding poverty and struggle (Reis, 2013; UN-Habitat, 2013).

3.5 Walkability in Libyan cities

Walkability has received considerable attention in developed countries, but few studies in Arabic language/ English language exist in developing countries, and almost no relevant academic investigation can be found for the particular case of Libya. Walking as a means of transport is not widespread in Libya, because of the availability of private cars and the relative low prices of cars and fuel (Abdulla et al. 2017). Also, the absence of oversight led to the emergence of the poor POS design and bad architectural features due to the failure of local authorities to develop solutions, which in Libyan cities has resulted in the essential absence of walking as an integral part of planning and design composition (Azlitn, 2009).

Nowadays, Libyan cities are facing a lack of maintenance of city centres, which has been disregarded by successive Libyan administrations, as evident in poor maintenance of open spaces, pedestrian paths, and street furniture. (Lakhder and Dugeny, 2010). Consequently, if people decide to walk, they do so when necessary for daily needs, such as walking to work, to school, or to shops, and not as a leisure activity per se.

3.6 Measuring walkability

Many researchers have examined the physical characteristics of places that may encourage walking. In this way scholars have identified different walkability assessment. In considering such tools, some scholars have noted that POS itself could actually decrease as well as increase walkability, depending on the particular context (for example, a sacred site such as a cemetery would not be an appropriate POS to increase walkability in city centres) (Zook et al., 2011; Lee and Talen, 2014). However, urban designers measured built environment variables they believed to be connected to recreational physical activity, such as the presence and proximity of facilities and destinations such as schools, workplaces and recreational facilities (Sallis, 2009). Many scholars hold the view that measuring walkability has generally taken two approaches, namely subjective and objective studies, depending on the type of data collected and the methods used.

3.6.1 Subjective measurements

Walkability Subjectively measurement focus primarily on users' experiences. Pedestrian opinions on their walking spaces are found from surveys and are used to estimate walkability. Subjective measures mean that people are stating their ideas about themselves and the world around them. Subjective measuring is about the built environment and it measures users' perspectives on infrastructure, such as access to, proximity of adjacent destinations, aesthetics/amenities, safety risks from traffic and street, and connectivity (Nyagah, 2015). Schlossberg, Weinstein, and Irvin (2007) asked: 'can a simple subjective question such as this be enough to evaluate streets and intersections on walkability principles, even with the eventual variation in subjective evaluations?' Livi and Clifton (2004) agreed that using ''subjective questions is a convenient way to sketch actual walkability conditions''.

3.6.2 Objective measurements

On the other hand, objective studies used objectively measured data from the field or databases, on infrastructure such as land uses and pathway geometry in walkability built environment (Saelens et al., 2003; Ewing et al., 2006; Ewing and Handy, 2009; Ewing and Cervero, 2010). Also, objective measurement tends to neglect non-functional aspects of the walking environment, such as a sense of security and comfort (Ewing, 1999). Furthermore, objective measures of walking environment build on measurable built environment data (De Vries et al., 2007; Owen et al., 2007), while subjective measures of the walking environment draw on self-reported perceptions of walking environments (Leslie et al., 2005; Cerin et al., 2010).

3.6.3 Walkability measurement factors

Walkability could be measured concerning the relevant factors or variables of the built environment about walking, presented subjectively and qualitatively. Litman (2003) defined walkability as 'the quality of walking conditions, including factors such as the existence of walking facilities and the degree of walking safety, comfort, and convenience’. However, Adam (2013) argued that the previous definition did not specify both tangible and intangible walkability factors. Thus, the question arises: what subjective variables to include in walkability assessment?

Giles-Corti et al. (2006) tried to answer this question by illustrating the importance of using interviews to achieve a deeper understanding of what variables are deemed important by the users of a POS. Also, Pikora et al. (2003) used policy literature, published evidence, and interviews with Delphi experts, recognising agreement levels from calculated interquartile ranges (IQR) for items scores assigned by Delphi experts. An IQR of <10 indicated the most significant agreement for walking. The researchers came out with a final paradigm determining four categories of open spaces factors that could potentially influence walkability, as shown in Figure 3-1.

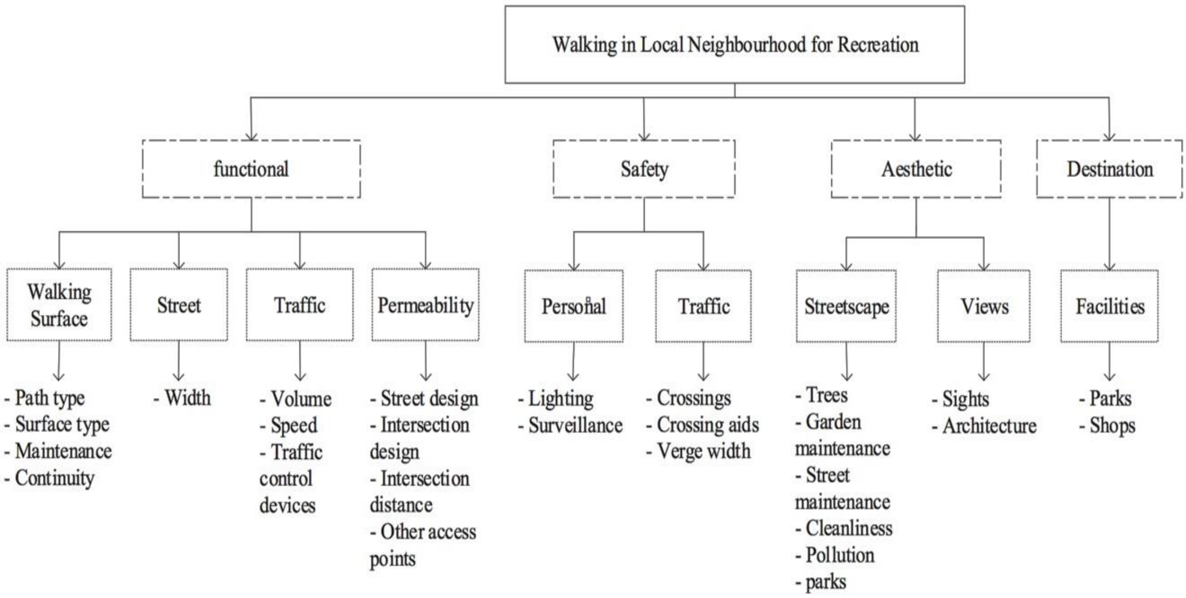


Figure 3-1 Physical environmental factors influencing recreational walking in the local neighbourhood

Source: Pikora et al. (2003)

The groups shown in Figure 3-1 include three major categories particularly pertinent to walkability:

- Functional, including elements such as path surface, maintenance, continuity, traffic operation and control devices, and roadway geometry and midblock access points.
- Safety, including personal safety features such as lighting and surveillance, as well as traffic safety aspects such as crossing aids and buffers.
- Aesthetics, including streetscape (e.g. maintenance and cleanliness) and view (e.g. architecture).

Pikora et al. (2003) also found that interview method highlighted issues that were important in walkability concerning the order of presentation of destinations, personal safety, and attractive spaces. Another measurement model specifying the relative importance of different factors for walking is Alfonzo's (2005) hierarchy of walking needs model (Figure 3-2). This model posits that walking decisions are related to the extent to which the POS meets users' needs. The most fundamental of these is feasibility, followed by accessibility, comfort, safety, and pleasurability (in decreasing order of importance).

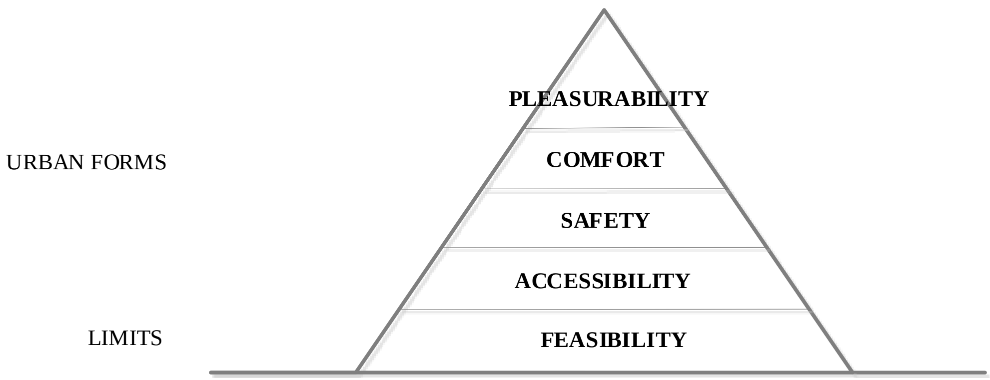


Figure 3-2 The hierarchy of walking needs

Source: Alfonzo (2005)

The model suggests that when more needs are met, users will walk for a longer time. Certain types of needs may be more salient depending on the reason for walking, for instance, pleasurability may play a bigger part in the decision to walk for pleasure, compared with destination walking for transport. The potential of different environmental features to engender different walking behaviours is reflected in the model. In addition, the development of detailed theories like Alfonzo's (2005) opens the way for measurement tools that identify walkability in specific locations.

Many scholars have commended the Neighborhood Environment Walkability Survey (NEWS, 2002), designed to measure US residents' perspectives of the environmental attributes of their local areas (Saelens et al., 2003; Brownson et al., 2004; Leslie et al., 2005; Cerin et al., 2006; Cerin et al., 2007; Cerin et al., 2008; Cerin et al., 2009, 2010). In the survey users are asked to rate their neighbourhood (local environment) for a number of different factors, including street connectivity, land use mix, neighbourhood aesthetics, traffic hazards, crime safety, and infrastructure for walking. This measure has been associated with positive physical activity and walking outcomes (Kaczynski 2010; Arvidsson et al., 2012).

Many diverse approaches exist for measuring the open spaces and the qualities of using any measurement approach depends on the required information, and the background and purpose of the study (Ewing et al., 2006; Brown et al., 2007; Sauter and Wedderburn, 2008; Brownson et al., 2009; Kelly et al., 2011). Ewing et al. (2006) agreed that perceptions of the walking environment are influenced by physical features for walking, amongst other things, and determine overall perceived walkability and walking behaviour, and they identified and grouped the factors into eight urban design qualities (imageability, legibility, enclosure, human scale, transparency, linkage, complexity, and coherence) and the physical features of the pedestrian facilities. They recommended that the walkability phenomenon can be understood using either objective or subjective measures, as shown in the proposed continuum line in the framework below (Figure 3.3).

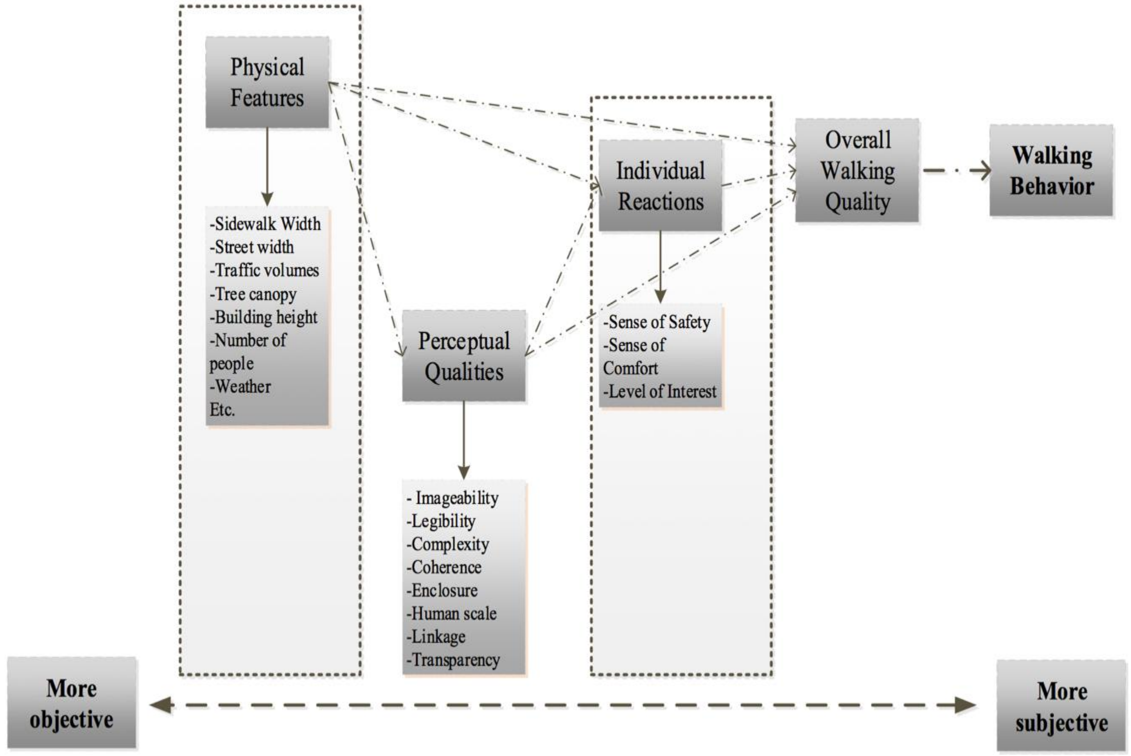


Figure 3-3 Conceptual framework of physical and perceptual qualities influencing walking

Source: Ewing et al. (2006)

Walking is a means of giving a chance to interact with the wider society and local environment in a way not likely when using other types of transport. Walking is both an indicator of and a way of improving the public realm as part of the improvement in urban renaissance and local environment (Gehl and Gemzoe, 2003). Research on pedestrians' walking experiences is generally subjective, and the built environment can be subjectively measured according to pedestrians' perceptions of urban space infrastructures, such as street connectivity, access to and proximity of adjacent destinations, aesthetics/amenities and safety risks from traffic and crime (Nyagah, 2015).

Questionnaires are usually used to capture pedestrians' perceptions. Livi and Clifton (2004) showed that using 'a perception question is a convenient way to sketch actual walkability conditions. Surveys are applied by making phone calls, either mailing questionnaires to respondents or interviewing the open space users in their walking spaces. Three surveys in Leeds (UK) were done to more understanding of factors that influence levels of walking and pedestrian route choice by Kelly et al. (2011). They assessed the pedestrian environment from pedestrians' perspectives. The first survey was a stated priority survey, used to identify the relative influence of POS factors determined from reviews of walkability studies; higher scores indicated a more suitable pedestrian walking environment. The second survey investigated values and attitudes towards different attributes of the walking environment, while the third survey was a walking interview designed to capture actual pedestrian experiences while respondents were walking.

Mehta (2008) combined the perceptual factors of Ewing and Handy's (2009) conceptual model of the environment with an ecological model of walking behaviour that incorporated Alfonzo's (2005) hierarchy of walking needs to make a comprehensive and complete model for the main street (Figure 3.4). Informative models using socio-ecological perspectives to examine the relation between the built environment, and physical activity have been determined as optimal, due to incorporating the functions of the extra-individual (social, physical, and contextual) and intra-individual (personal and behavioural) variables on behaviour outcomes (Sallis et al., 1998; Humpel et al., 2002; Pikora et al., 2002; King et al., 2008). Mehta's model comprises the accessibility and feasibility affordances of a trip consistent with perceived behavioural control as a determinant of behaviour.

Makki et al. (2012) argued that there are three factors of functionality for pedestrian networks: personal factors such as gender, health and age; environmental factors such as accessibility, connectivity, safety, weather and terrain; and visual interest along the path network, such as buildings, landscaping. Finally, the Bicycle Federation of America (1998) described the characteristics of a walkable city as including the following parameters:

- Coherence: A clear, understandable and organised pavement, street and land-use system consistent with the scale and function of the surrounding urban context. The pavement and street system should link points of interest and activity, provide clean lines of sight and travel, and include simple instructive signage.
- Continuity: A pattern of design and usage that unifies the pedestrian system.

- Equilibrium.
- Safety: Pedestrian protection from automobiles and bicycles. Adequate time to cross intersections without interference. Physical separation from fast-moving cars. Signalization protection when crossing intersections.
- Comfort: Secure and negotiable paving materials for pavements and crosswalks. The unobstructed passage on the pavement and at corners. Signals timed to enable safe and quick crossings.
- Sociability: A sense of hospitality and suitability for individual and community interactions. Pavements should provide for a variety of uses and activities characteristics of the diverse urban scene.
- Accessibility: The opportunity for all individuals to utilise the pedestrian environment as fully as possible (Bicycle Federation of America, 1998).

3.7 Factors of walkable open spaces

The previous parts of this chapter have presented vast numbers of physical factors pertaining to the walkable environment. However, studying the perceptual qualities of the environment is challenging, as it cannot be proficiently quantified or measured; furthermore, it is not clear which of these factors are more prominent, nor how or whether these factors interact in affecting a person's level of physical activity. Official spatial data does not give insight into qualitative and perceptual structures that influence the walkability experience (Azmin-Fouladi, 2007; Ewing & Handy, 2009).

There is a range of researches which have looked at correlations between walking activity and variety of environmental features (Badland and Schofield, 2005; Clifton et al., 2007; Borst et al., 2008). Many studies focused on physical environmental features and streets designs more than pedestrians' perceptual concerns. Additionally, there is no agreement on what determines walking behaviour, although there are themes and qualities that are found across assessments of walkable open spaces (Clifton et al., 2007). Many serious studies show that specific characteristics of build environments can influence walking in POS, as described below (Jacobs, 1961; Gehl, 1980, 2010; Ewing, 1999; Lawrence and Peter, 2000; Handy, 2005; McNally, 2010).

3.7.1 Accessibility

Accessibility is an essential principle for pedestrian comfort (Vojnovic, 2006; Hutabarat, 2009). Accessibility refers to the ease of moving from origins to destinations; it is the main factor influencing the pedestrian route choice. Additionally, street networks need to be well-planned and connected with proper pavements to diverse destinations to raise the spirits of walking in the city (Kumar, 2010). A well-planned and connected street network has streets integrated and linked to numerous other kinds of transportation (Southworth, 2005). Also, the accessible POS should provide varied uses of buildings, spaces, high quality of paths, clear signage and appropriate width of walkways. All of these components are important to facilitate and encourage walking. Accessibility to the transportation system, as well as connectivity of the walk paths, are part of walkability (Pikora, 2003; Southworth, 2007). Furthermore, easy access to destinations is shown to correlate positively with walking for transport reasons (Handy et al., 2002; Frank et al., 2003; Saelens et al., 2003).

Tolley (2003) classified accessibility based on walking purposes which can be explained in four different ways as:

- Access mode or functional walking − walking to get to the workplace, shops or school.
- Access sub-mode − the primary way of getting to public transport services.
- Recreation leisure mode − walking for the sake of walking, for example walking the dog.
- Circulation exchange mode − where a range of non-transport activities on foot are carried out by people in public spaces, such as chatting to neighbours, window shopping, or having a drink on a pavement cafe.

Streets with a massive amount of frontages taken up by parking makes pedestrian entrance to buildings more difficult, by requiring walkers to cross the parking lot (Abdulla et al., 2017). As stated by Handy et al. (2006), diverse physical settings may affect the walking pattern and route choice; for instance, walkers who choose to walk may consider the distance to the destination as very important to decrease the time consumed. They will prefer an area that has a short walking distance and high connectivity walkways. Hence, the distance of walking and connectivity should be maintained to decrease the cost of travel and reduce the time cost. To sum up, scholars suggest that proximity, connectivity, and accessibility are important principles in encouraging walking activity. (Frank and Engelke, 2001; Handy et al., 2002). Accessibility is always attached to the urban pattern in the POS. While measuring access can be a complex task, if the aim is to expect travel behaviour and behavioural changes resulting from different urban patterns, then multiple measurements of individual access are essential.

3.7.2 Comfortability

Alfonzo (2005) defines comfort as the people's level of ease, convenience and contentment, while Sarkar (2002) refers to it as the pleasant state of physiological, psychological, and physical coordination between the environment and the human body. Both scholars describe the pleasant feeling that individuals feel when they interact with the environment. Alfonzo (2005) illustrated that the environmental qualities that ease walking and support walking activities affect a person's level of comfort. Kumar (2010) added a good design, materials, space for walking, human scale and good surfaces to encourage walking in POS are determinants of pedestrian comfort. Furthermore, Carmona et al. (2003) point out that the sense of comfort is dependent on the environmental factors (e.g. protection from wind, sun, etc.), physical comfort (e.g. comfortable and enough seating facilities), and social and psychological comfort, which is strongly affected by the inherent characteristics of a POS.

Pavements and street networks must have a good design and maintenance to allow for comfortable walking (Hence et al., 2006). Moreover, Hutabarat (2009) confirmed that this includes pedestrian pathways and pavements that connect walkers to frequent transit services with safe crossings. Comfortable walkability entails accessibility to facilitate people with different needs (particularly disabled access) (Carmona et al., 2003).

Gehl (2010) found that the average comfortable walking distance for an able-bodied person is up to 600 meters in 10 minutes, and fatigue and discomfort may arise if walking for more than 15 minutes or 1000 meters. As shown in Figure 3-4, when areas are of poor quality only strictly necessary activities occur, while good quality is conducive to increased frequency of optional activities, and as levels of opportunity arise, the number of social activities usually increases (Gehl, 2010).

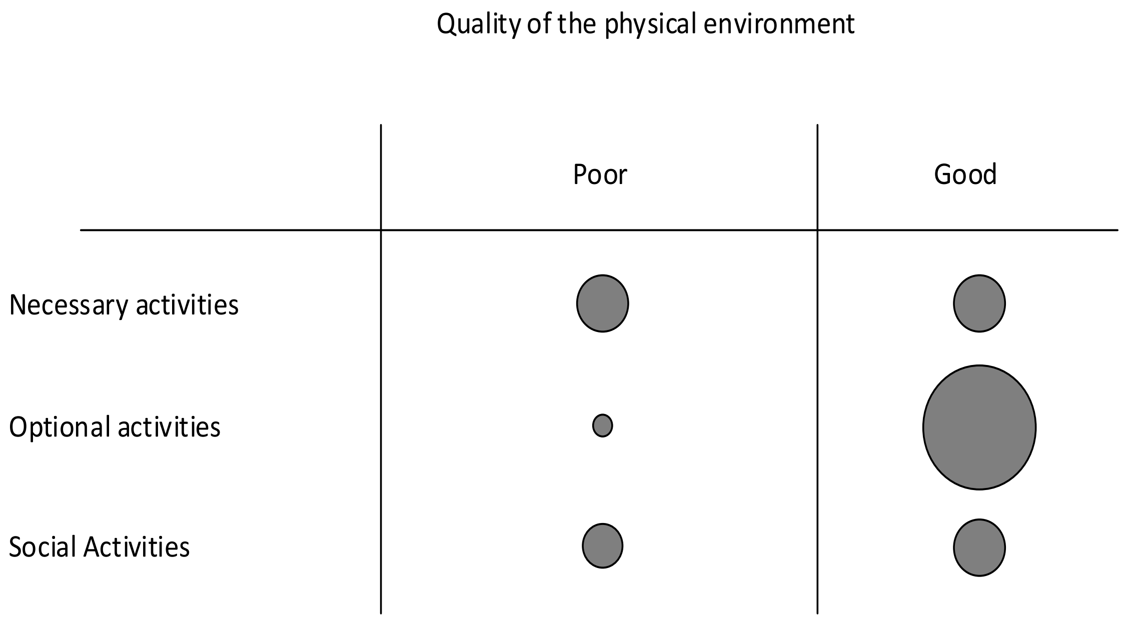


Figure 3-4 Outdoor activities and quality of outdoor space

Source: Gehl (2006)

In addition, Handy et al. (2007) identified that the comfortable built environment gives a bigger effect on the trip lengths than trip frequencies. Regarding this, the level of comfort should be determined by the range of period people would spend at the public space (Carmona et al., 2003). Though it is quite tough to determine comfort, as different persons perceive it differently, perceiving how the public response towards the surrounding can identify it. As well previous studies have reported that the concerning comfortable walking space conducted the only subjective evaluation with a questionnaire (Tsukaguchi et al., 2003; Toyoshige et al., 2011). Accordingly, it is apparent that the environmental features and the physical arrangement of urban components are useful in providing comfort walking in POS.

Abdulla et al. (2016) illustrated that in Libya there is a lack of maintenance of pedestrian pathways, pedestrian facilities, street furnishings, and landscaping. They also indicated that the existence and condition of pedestrian ways in addition to the ways in which they used are useful for city design professionals to classify walkable comfortable elements that improve the level of walkability in Libyan cities, to improve their sustainability and make them more liveable.

3.7.3 Safety and security

Numerous researchers (Echeverria et al., 2004; Loukaitou-Sideris and Eck, 2007; Abdul Karim and Azmi, 2013; Kerr et al., 2015) have studied the mixed relation between walkability and safety-security. While only few researchers have studied the specific segments of safety-security as the main factor of walkable public spaces. Safety-security in POS has become a central concern in urban places around the world, specifically with the rise of social and ethnic conflicts, but in places of armed war, there has not been enough researches. As one of the human basic needs' safety needs come right after psychological ones are relatively satisfied (Maslow, 1970). Fear comes to the forefront, if users' safety needs are not met properly (Tandogan and Ilhan, 2016).

Pedestrian safety in developing countries is affected by existing conditions such as poor of crossings, the lack of separation between vehicles in busy roads and pedestrians, the combination of poor street lighting and high proportions of pedestrians walking at night and the presence of roadside vendors (Tulu et al. 2013). Safety is considered the most basic factor when valuing POS because the perceived safety has a strong influence on the decision by the individual to use the space, or to avoid it (Mehta, 2014). Nasution and Zahrah (2012) agreed that a successful POS should augment people's safety.

Social interactions in POS in the city centres can be increased directly by installing big public displays like digital boards that act like CCTV (Askari, 2014). On the other hand, creating safe POS is inextricably dependent on both environment responsiveness and activity. Environment responsiveness is the way to deliver effective lighting systems at night-time, planning effective gathering spaces, and cutting traffic burden (Austin, 2002). Users of POS in Tripoli have worries about safety, particularly for areas with lack of lighting at night, such that women seldom use some POS during night periods (Abdulla et al., 2016).

Safety's effect on social interactions and outdoor activities may have positive effects on both psychological and physiological markers of social health, in addition to its potential prevention of psychological stress (Stafford et al., 2007). These days, the crime rate in Libya is increasing every day, as NUMBEO (2017) shown in their reports. The data on the NUMBEO website is built on perceptions of visitors of this website in the last 3 years. The NUMBEO website (www.numbeo.com) scores the quality of life in a city by asking those who have been there to rate various aspects of life there between 0 – very poor – and 100 – excellent. The scores for various aspects of life in Tripoli are shown in previous chapters. Safely walking alone during daylight in Tripoli is 60.33%, which is high, while safely walking alone at night is 35.87%, which is low.

3.7.4 Pavement

In *The Death and Life of Great American Cities*, the pioneer of modern urban planning, Jane Jacobs (1961), claims that the ideal neighbourhood is designed to ease walkability. Jacobs used language which highlighted the structures that make a neighbourhood well suited to pedestrianism with some precise benefits, comprising crime decrease and accruing social capital. In the introduction to her book, she illustrated that there are *car people* and *foot* *people*, and that her book was written for the latter. Jacobs was not necessarily saying that neighbourhoods or cities designed for cars are inferior, but there are benefits to permitting the development of neighbourhoods that allow for the select of walking, that is what modern planners call complete streets or (multi-modal) access.

Previous studies show that the presence of pavements in POS is positively associated with high levels of walking (De Vries et al., 2007; Rodriguez et al., 2008). There are central features of pavements that related to the physical separations from vehicle traffic, the presence of businesses and parking presence of that considerable influence perceived service level. Furthermore, the roles of environmental factors, for instance, rain and lighting, day-time or night-time are essential in affecting walkers' level of service perceptions (Kang et al., 2013). The importance of a pavement to encourage walking is more than just psychological but for walking in a safe environment. Collisions between walkers and motor vehicles are more than twice as likely in places without pavements (Retting et al., 2003; Campbell et al., 2004).

Owen et al. (2004) reviewed researches investigating the effect of built environments on pedestrian activity. After investigation, they found that the most studies they analysed (37 versus 25) presented a statistically significant correlation between walking behaviour and pavement presence. High quality pedestrian facilities, including pavements, have been shown to raise pedestrian activity, even when land use and other built environment characteristics stay constant (Saelens et al., 2003). Also, Cervero and Kockelman (1997) proposed that a pavement, among other pedestrian-built form elements, related positively to promoting journeys which did not depend on personal vehicles.

Previous researches have tried to identify how pavements affect public transit (Clarke, 2003; Guo and Ferreira Jr, 2008). This faces the complexity mentioned above in measuring the wide range of impacts involved in the pedestrian environment. Further complicating the situation, collection the data of pedestrian activity frequently neglects trips less than one kilometer (Mees, 2010). In spite of these limitations, Rodríguez and Joo (2004) stated that pavement continuity influenced mode choice both for full journey and accessing transit. Hence, the objective to create environments that support kinds of transportation other than cars, such as public transit, reveals the necessity for an integrated approach to infrastructure. Lakhder and François (2010) showed that Tripoli city centre effectively lacks pavements, which adversely affects walking in a city centre.

3.7.5 Mixed land use

Several studies indicate that mixed land use usually supports walking, for instance a meta-review completed by Saelens and Handy (2008) of 13 prior reviews of walking and the built environment showed important support for walking and two overlapping measures of diverse land uses: distances to walkable destinations, and land use mix. They reviewed past studies showing mixed land use related to leisure or activities and transportation or destination-oriented walking. They found that most studies during the period of interest (2005-2006) maintained the relationship between mixed use and walking for transportation, not leisure walking.

Brown et al. (2012) confirmed in their comprehensive review of Cervero (1996), Cervero (2006), Krizek (2003), and Saelens and Handy (2008) that mixed land use supports physical activity by giving a range of destinations within walking distance, like grocery stores and transit stations. Forsyth et al. (2008) examined 44 alternative walkability measures and found that only the measure of social land use (e.g. for shops and parks) is associated with more walking for transportation. Other researchers examined neighbourhood land spaces or proportions measured to be walkable places, but without integrating them into statistical summaries, for instance more public spaces and social land use related to walking for leisure/activities and transportation, respectively (Giles-Corti et al., 2005; Forsyth et al., 2008; Brown et al., 2009).

3.7.6 City centre activity

Walkability and city centre activity have been correlated for years. Building on *The Life and Death of Great American Cities* (Jacobs, 1961), Cook (1980) and Gehl (1989) affirmed city street activity and vitality as the powers behind successful and growing urban places. Additionally, they saw an urban design of societies not only an arrangement of physical space but also the activities and events that happen there. Therefore, Canter (1977) argued that the concept of 'place' is made up of the interaction of three components, as shown in Figure 3-5: (1) 'conceptions', which refers to the perceptions and values that individuals hold; (2) the 'activities' that people may engage in; and (3) the 'physical attributes' of the environment (e.g. size, shape, colour, textures, and forms).

Diversity of activities, including sport, shopping, taking a walk to get fresh air, sitting, reading outdoors, children playing, meeting and having conversations, plays an essential role in shaping POS. Furthermore, the 'making places' tradition focuses on the diversity of activities, which help create successful public spaces (Lepofsky and Fraser 2003).

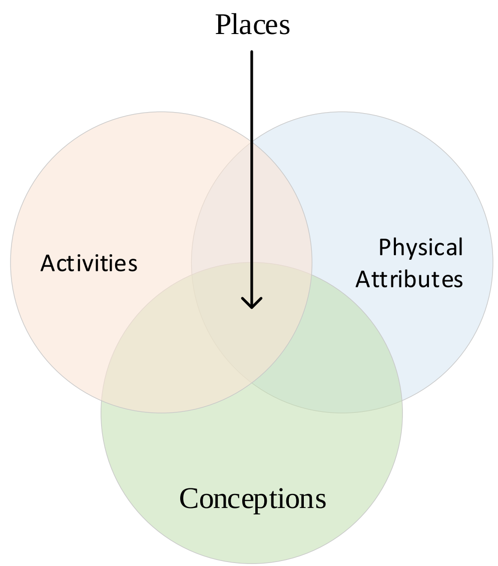


Figure 3-5 The three components of concept of 'place'

Source: Canter (1977)

Gehl (1987) defined the type of POS activities into three types:

- Necessary activities: those activities that need to take place, independent of the quality of the surrounding physical environment. Going to work, to school, taking the bus are examples of these almost necessary activities, and many of these activities are related to walking.
- Optional activities: these activities are dependent on other conditions, such as the weather, and what the outdoor physical environment can offer. Activities such as taking a walk to get fresh air, sitting, reading outdoors and sunbathing are not obligatory.
- Social activities: these occur when people meet in a particular place (children playing, meeting, having conversations, having a picnic).

Gehl (2011) affirmed that POS are only successful if optional and social activities occur. Moreover, PPS (2000) also identified four key qualities in common: access and linkages, comfort and image, uses and activities, and sociability. Carmona and Punter (2003), as shown in Figure 3-6, opined that the basic elements of the identity of place are static physical setting, activities, and meanings.

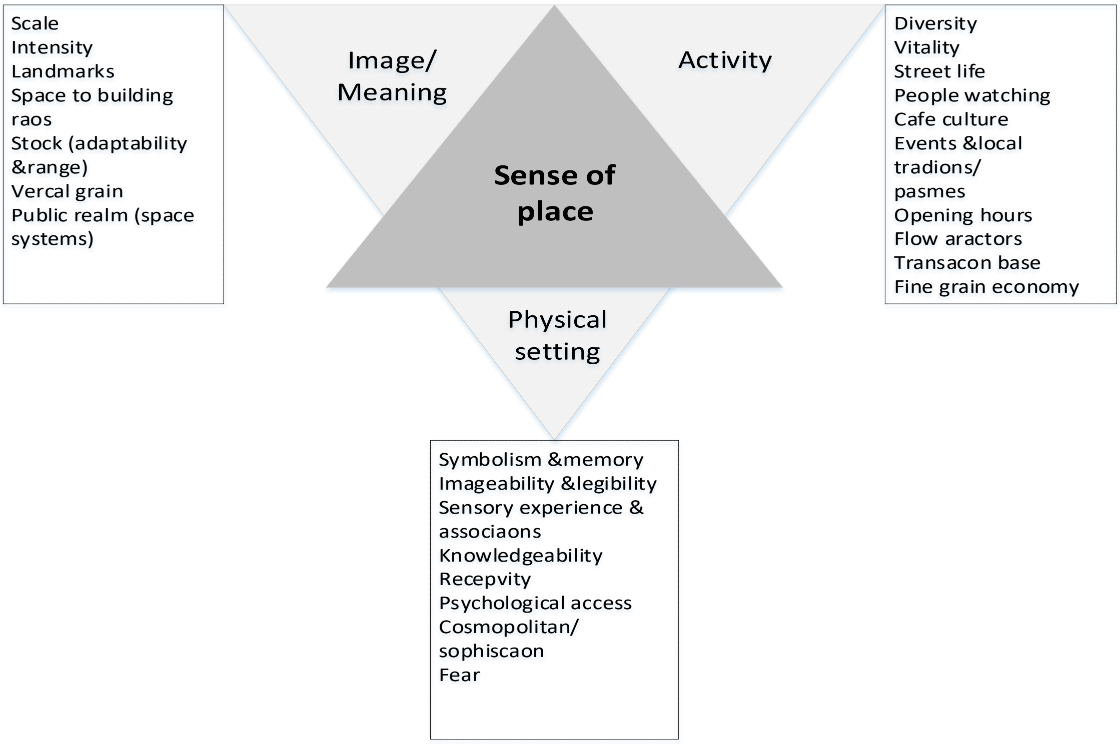


Figure 3-6 Three basic elements of the identity of place

Source: Carmona & Punter (2003)

Finally, it must be emphasised that high quality of design is not enough to create walkable and liveable spaces. It is important to provide physical, social, economic and environmental solutions to improve walkability and liveability in POS (Lambert, 2005). On the other hand, Mohamed (2013) argued that the lack of POS in core areas quite often poses a challenge to their upgrade, whereas the land use in Libyan cities is far from sufficient for social activities. However, Lakhder and Dugeny (2010) and Zaqlai (2015) confirmed that the importance of the activities in Tripoli's main POS for encouraging people to walk in the city centre, and also noted that there is a lack of POS management in creating outdoor activities.

3.8 Summary

It should be emphasised that the purpose of this chapter was to highlight walkable POS dimensions, elements, and the method of walkability measurement that might serve the main aim of the current study, which is an analysis of barriers and success factors that influence the effective walking experience in Tripoli, Libya. The chapter has explained the subjective nature of user appreciation of POS, thus design and management for a walkable city must be based on user requirements, and in tandem with socio-demographic, mixed land use, diversity, accessibility, pedestrian facilities, convenience and comfort, safety, and aesthetic elements, as shown in Figure 3-7.

Moreover, the chapter drew attention to the deficiencies found in the literature concerning the walkable POS of Tripoli and its municipality, particularly in studies on walking measurement in Libya and Tripoli pertaining to user behaviour. Most new design concepts studied in this chapter are based on key primers for walkable cities, including providing mixed land use with a diversity of activities, linking urban development to transit provision, providing accessibility by public transport and maintaining perceptions and the reality of safety and security. Consequently, the researcher is of the opinion that the impact of these emerging variables can also improve the walking environment in cities of developing countries such as Libya.

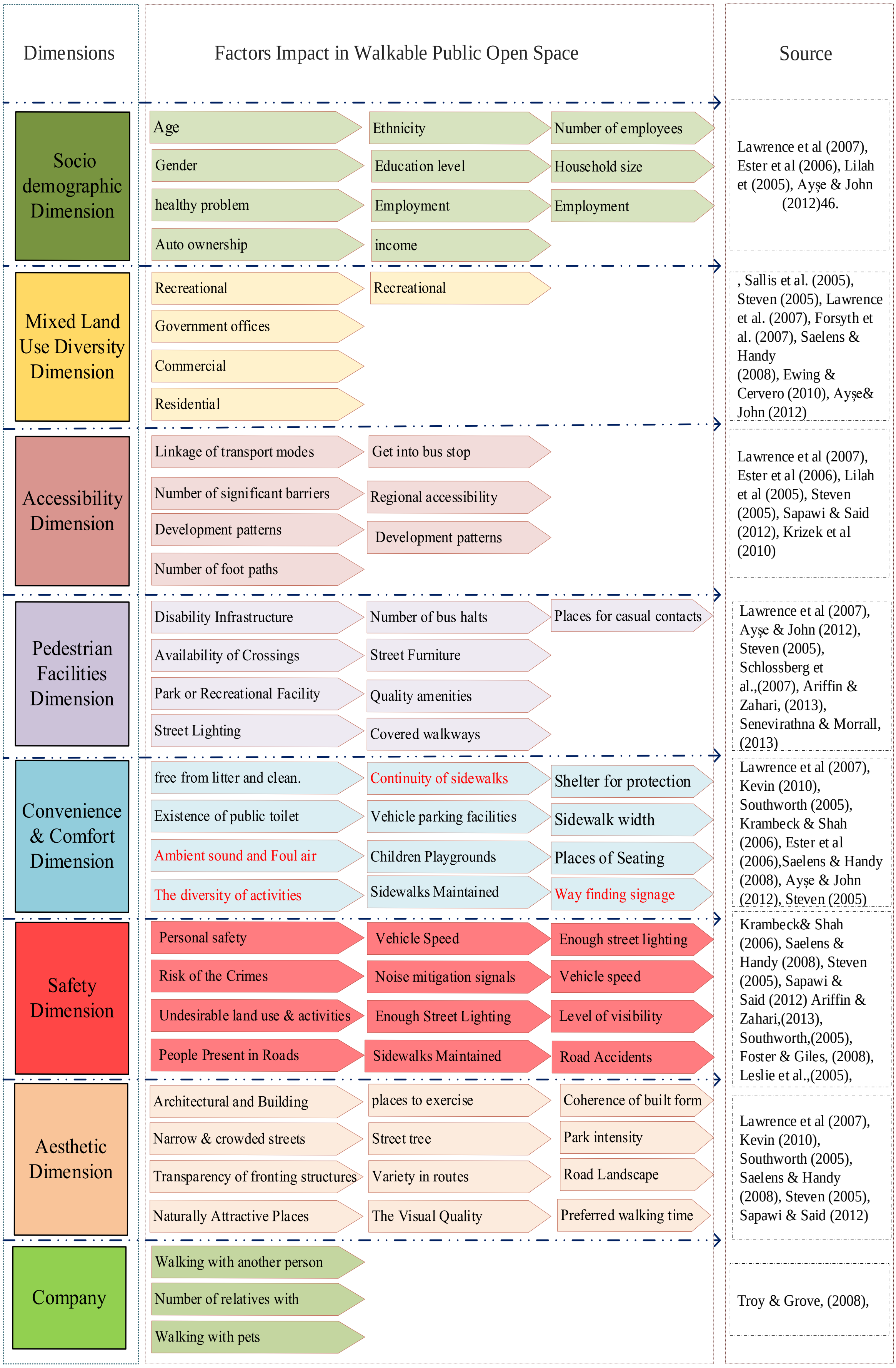


Figure 3-7 Dimensions and factors impact in walkable public open spaces

Source: Author

Chapter 4

Research Methodology

The focus of attention on walkability and pedestrians' experience of walking in POS for all purposes, and particularly with regard to lifestyle, is an extraordinary research project for the Libyan context. The lack of walkability literature in the Libyan context not only justified conducting this research in the first place, but also emphasised the need to seek for an innovative methodological strategy for collecting the data required to respond to the research objectives. Chapters 2 and 3 provided a comprehensive literature review to address the primary research issues and reviewed a number of key empirical and theoretical studies on walkable urban space. This chapter outlines the methodology subsequently adopted by this study, based on extending existing literature with the case of Tripoli. A multi-methods approach was adopted, with mixed methods research containing both quantitative and qualitative data collection and analyses. This chapter is organised in sections covering the research approach, Delphi method, questionnaire design, survey and data analysis, observation method, FGD, and validity and reliability.

4.1 Research approach, data collection and analysis

The research strategy aims to identify and analyse barriers and facilitators of walkability in Tripoli. As discussed in the previous chapter, walkability is essentially a subjective phenomenon depending on human perception and interpretation; consequently, social science methodologies are apt to explore its subtle aspects, while quantitative insights are also pertinent due to the involvement of urban planning, traffic management, and architectural and built environment aspects (Crotty, 1998). The nature of the epistemological choices made to explore research phenomena are grounded in the underlying research philosophy, which concerns the nature of existence and what can be known about it (Saunders et al., 2009).

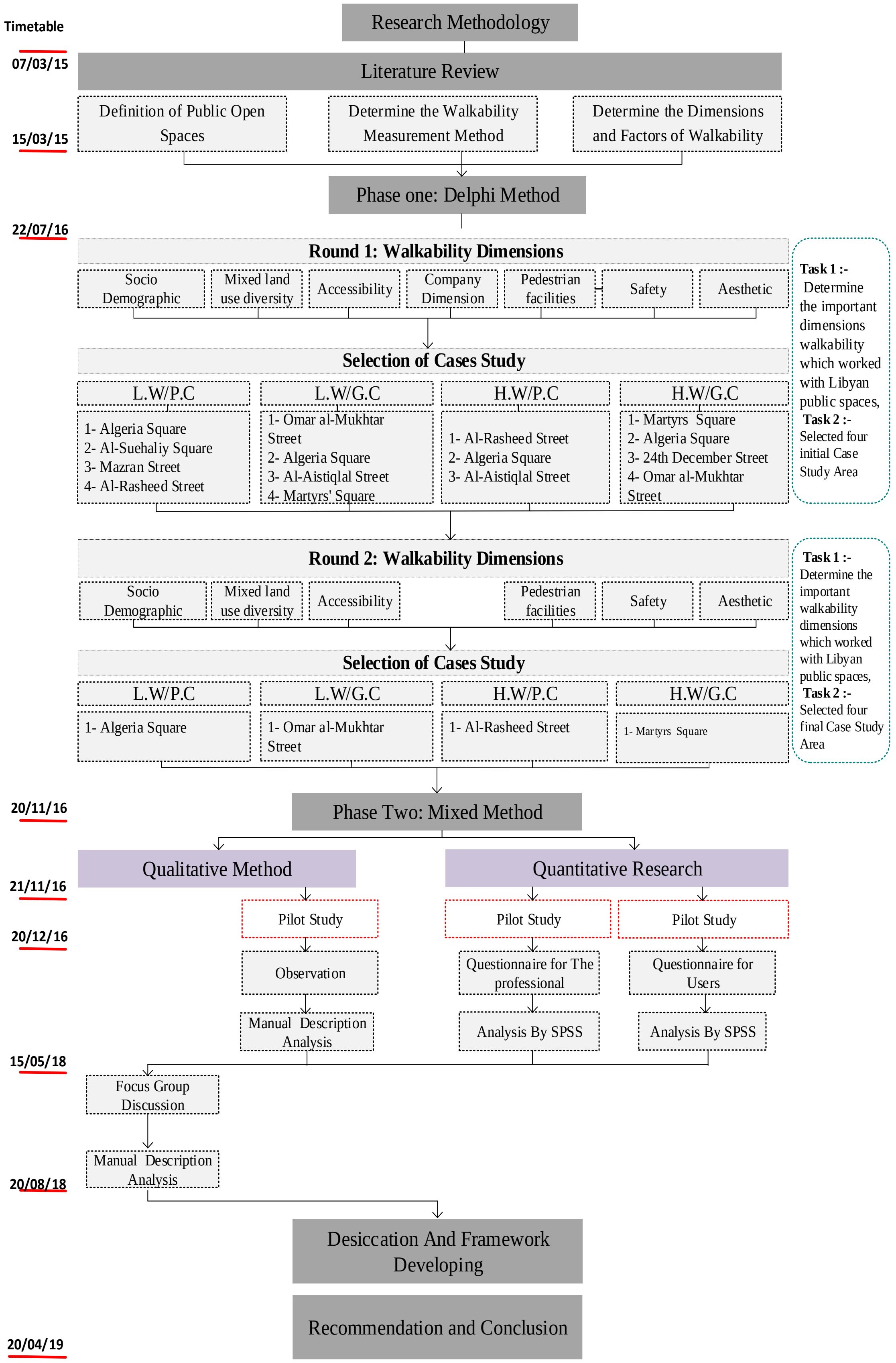
Pole and Lampard (2002) illustrated that the researcher is a careful search or to search again for gathering information, which can be used to produce or to enhance knowledge. The natural and social sciences are associated with positivist and post-positivist ontologies, respectively (Bryman, 1988; Grix, 2004; Mark, 1996). Post-positivism is associated with qualitative research premised on relativism or social constructionism, which posits that subjective experiences of realities form human experience of the world, rather than an overarching external reality understood through experimentation to find universal laws; the latter view underpins the natural sciences, while post-positivism is predominant in ethnographic and social science approaches. For practical purposes, both paradigms may be combined to expediently explore ‘real’ phenomena of interest to researchers.

Positivism assumes that the social world is external to the observer and that its attributes can be objectively measured; conversely, interpretivism, the main post-positivist approach, considers the world to be socially constructed and consequently amenable to only subjective forms of measurement (Easterby-Smith et al., 2012). Walkability investigation has a comprehensive outlook overlapping several physical and psychological disciplines from the applied to the social sciences (Gehl, 2006; D’Arcy, 2013; Robson, 2011). This research builds on the critical realist approach as the primary research approach, as well as taking into account the importance of both the physical and psychological world. This approach engages the two classic research approaches – positivism and constructivism – and aims to compensate their respective limitations (Robson, 2011). The realist approach builds on known knowledge to focus on refining existing theories by explaining how, for whom and under what circumstances complex programs work (Pawson, 2006).

Many scholars of quantitative and qualitative research paradigms have argued the superiority of each paradigm over the other in particular fields, and claimed that two research paradigms could not and should not be mixed (e.g. Ayer, 1966; Schwandt, 2000; Maxwell and Delaney, 2004; Lincoln, Lynham, and Guba, 2011), but most researchers do not set out from confessional ontological beliefs and construct their research philosophies accordingly, rather they select methods that are the most likely to yield the data they require for practical purposes. Furthermore, neither of these two paradigms is considered better than the other, and it is more useful to think of them as being on a continuum (Collis and Hussey, 2003). A quantitative research strategy is underpinned by experimentation and usually attempts to compare or correlate one study group with another. Qualitative research strategy relies more on case studies, employing in many cases ethnography and grounded theory.

The overall approach to this study is a mixed methodology, which combines quantitative and qualitative methods, with a view to exploring walkability as understood from the review of literature presented in previous chapters. The dominant approach is quantitative, relying on data collection using a self-administered questionnaire for POS users and experts, designers, administrators, and professionals. It is supplemented by a qualitative method in the form of observations and expert FGD. Furthermore, the veracity of the results gained from quantitative methods are validated by a panel of experts, carried out using the qualitative method of FGD.

In a research study such as this, it is important to identify precisely what tools and procedures are to be used in data collection and analysis. Data for the study were collected from both primary and secondary sources. Data from primary sources were collected using Delphi method, survey questionnaire, observation, and focus group method. Data from secondary sources were collected from the literature review. Figure 4-1 summarises the process and key stages in this investigation.



L: Law, H: High, W: Walkable, G:Good, P: Poor, and C: Environment Condition,

Figure 4-1 Flowchart showing the research process
Source: Author

4.2 Phase 1: Determine the general factors influencing users' decisions to spend time walking and revisiting the POS in Tripoli

Due to the lack of studies concerning walkability in POS in Libya, Delphi method was used in this research to determine the general factors influencing users' decisions to spend time walking and revisiting the POS in Tripoli. This involved exploring the consistency and validity of the 71 factors of POS walkability identified from the literature review with regard to Tripoli, using the strategy adopted by previous researchers (Shafaghat, 2013; Ranasinghe et al., 2016).

The Delphi technique can be defined as a team decision technique, which needs skilled experts with profound knowledge on relevant issues (Okoli and Pawlowski, 2004). Norman Dalkey (1962) of the RAND Corporation developed the original Delphi method in the 1950s and proved that decisions made by groups are generally more reliable than those made individually; it has been widely used since to establish objective consensus on complex issues (Keeney et al., 2011). This technique is a group facilitation method, which is an iterative multistage process designed to transform opinions into group consensus (Felicity et al., 2000). This method has been used for long- and short-range forecasting of future events to gain a consensus opinion or to emphasise differences of opinion and develop alternative future scenarios (Austin, 2015). This phase aimed to explore the consistency and the validity of the 71 factors of walkability in POS identified from the literature review concerning the streets and public squares on Libyan cities in general, and Tripoli in particular, where data collection was conducted. Moreover, the experts were involved in the selection of the case study areas.

4.2.1 Reliability in Delphi method

Different expert panels could produce different results when given the same Delphi survey, so critics have concerns about reliability (Sackman, 1974; Goodman, 1987). Some would argue that it is not possible to determine reliability, as each Delphi survey round involves the creation of a new measuring instrument (Rowe et al., 1991, Engels and Powell Kennedy, 2007). Nevertheless, Duffield (1993) found 93% interrater agreement in the same survey between two separate panels that differed marginally in size and composition. Interestingly, the survey has also shown good test-retest reliability over the long term, including two studies being conducted 16 years apart in one case (Ono and Wedemeyer, 1994). However, testing any questionnaire's reliability is difficult (Brace, 2010b, Hasson and Keeney, 2011). Opinions differ on reliability concerning panel size, the use of open first rounds, the interactive nature of Delphi technique and the avoidance of group bias (Linstone and Turoff, 2002; Okoli and Pawlowski, 2004; Hasson and Keeney, 2011). Appendixes 2 and 3 present a blank copy of rounds one and two, as designed by the author.

4.2.2 Level of expert consensus

Scholars of the Delphi method differ on the required consensus. Earlier studies had low thresholds, including as little as 51% agreement (McKenna, 1989). More recent studies such as Hasson et al. (2000) stipulate 70% or higher, and Finger et al. (2006) advised a more rigorous 80%. Most figures range from 50-70% (Biondo et al., 2008). In this phase, a statement achieves consensus when it reaches 70% or more and therefore does not enter the subsequent round. The nature of this research is based on policy decisions involving very confidential and strategic choices, thus less than 70% agreement would represent a deficient and risky statement for the purposes of practical application. Furthermore, in both theoretical and practical issues, to assist any researcher in the management or business fields to conduct the Delphi technique demands a response rate above 70% (Giannarou and Zervas, 2014). Hence, Table 4.1 shows that a low consensus is reached with a result of 70-79% while medium consensus is between 80-89%, and consensus that falls between 90% and 100% is considered high consensus (Elgarhy, 2016).

Table 4.1 Delphi method consensus rankings

Low Consensus	70-79%
Moderate Consensus	80-89%
High Consensus	90-100%

Source: Elgarhy (2007)

4.2.3 Selection of Delphi panel

Participants were selected at this stage by a number of strategies. Firstly, the online survey website Survey-Monkey was used to host the survey, with invitations disseminated via Facebook pages to specialised professionals (e.g. town planners, architects, civil engineers, transport engineers, and urban designers). Participants who wished to participate voluntarily were asked to fill out the form in the survey link, with their phone number and email address to confirm the agreement. Secondly, from an internet search of the University of Tripoli website, the emails of the academic staff listed in the School of Architecture and Civil Engineering were used to invite them directly. Thirdly, research assistants went to the Ministry of Utilities and Housing, Department of Planning Municipality of Tripoli, and Urban Planning Department to seek approval from the professionals to participate in this survey, through filling out the form, which included their names, email addresses and phone numbers. 25 expert respondents who had agreed to participate in this survey (Appendix 1 showed the first email to engage expert for choosing walkability elements in Libyan context).

4.2.4 Case studies suggested

Case study method was adopted in this research. As described by Yin (2013), ‘case study can investigate a contemporary phenomenon within its real-life context, especially if the boundaries between phenomenon and context are not evident’. Furthermore, Siu (2007) and Song et al. (2016) illustrated that a case study is a right method for investigating phenomena in ambiguous urban spaces. Gillham (2001) defined case study parameters as:

- A unit of human activity embedded in the real world.
- Something that can only be studied or understood in context.
- Something that exists in the here and now.
- Something that merges with its background to that precise boundary-challenging to draw.

Yin (2009) agreed that cases could be included organisations, processes, programmes, neighbourhoods, institutions, events, as well as other phenomena. As part of this research phase (Delphi method), the case studies were suggested by the experts (Fitzsimons, 2013). This suggested had to be based on their own experience of their chosen areas. Moreover, the experts in a round one was asked to suggested four places in Tripoli under for conditions, and the requirements to accept place as a suggested case study were the following questions specifying the required criteria:

- Could you select a highly walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?
- Could you select a highly walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?
- Could you select a poor walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?
- Could you select a poor walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?

The two places most suggested under each condition were chosen to be queried in round two, requiring the experts to suggested just one place from the shortlisted pairs under each condition in order to select the final suggested case studies. The researcher has done final observation to be sure that the suggested case studies are appropriated.

4.2.5 Data analysis for Phase 1

The Delphi approach employs a variety of different analytical techniques, depending on the purpose of the research and type of data collected (Dalkey and Helmer, 1963; Skulmoski et al., 2007). Hsu and Sandford (2007) argued that, the type of data analysis researchers use for Delphi studies is at the discretion of the researchers themselves. Keeney et al. (2010) argue that the analysis should start with a description of the demographic data collected in the first round, as analysed previously regarding respondents' profiles, to give an overall profile of the expert panel. However, it is not necessary to ask about demographic data within a Delphi process, especially if expert members are well known in their field.

The most often mentioned disadvantage of open-ended questions is the extensive coding needed before the actual analysis can take place (Payne, 2004). Additionally, the freedom of response in open-ended questions can lead respondents to ambiguity rather than clarity (Courtney, 2011).

In round one, the aim was to generate as many perspectives on the focus areas as possible and to categorise responses in a manner that could be quantitatively analysed. An SPSS database was set up using the demographic labels as variables (e.g. years of experience, education level, the field of expertise, place of work, relevant publications, and knowledge of walkability). The data were entered into SPSS for each expert and linked to their codes. The aim from this round was to get comments and feedback and to ascertain agreement regarding the results. The findings were presented mainly in tabular form. The experts were invited to answer the questions on any aspect of the interim findings from round one, to get their agreement or disagreement, to suggest revisions and seek clarifications, or to add further information.

In the first round of the Delphi survey, the questionnaire was administered via the Survey-Monkey website to 25 expert respondents who had agreed to participate (Appendix 1 showed the first email to engage expert for choosing walkability elements in Libyan context). All 25 experts successfully responded with feedback. The purpose of this round was to identify relevant factors for measuring the walkability in urban open spaces in Libya. The questionnaire contained a selected list of 80 potential factors from the previous research studies concerning the field of walkability within the international and Libyan context (Table 5.2). The first round of the Delphi started with an open-ended questionnaire (Appendix 2) to identify the participants' opinions about what items should be included within walkability in Libyan POS by selecting Yes, No or Uncertain, in order to achieve objective 1 of the study. The questionnaire consisted of seven main dimensions: Socio-demographic factors, Mixed land use diversity, Accessibility, Company, Pedestrian facilities, Convenience & Comfort, Safety & Aesthetics), with each dimension being concerned with vital items of LPOS. The function of the first Delphi questionnaire can be described as the generation of items, issues or questions (Issac and Michael, 1995).

4.3 Phase 2: Mixed methods

The mixed method phase comprises questionnaires designed for users and relevant professionals, observation, and FGD.

4.3.1 User and Professional Questionnaire Survey

The most significant part of the research was the design of the questions to collect relevant and valuable data which will answer the research questions and meet the study objectives. The study employed two separate questionnaire surveys, for users and relevant professionals, collecting data on the barriers and success factors relating to users spending time walking and revisiting POS in Tripoli. The original questionnaire forms were designed in English and then translated into Arabic. Development of the questionnaire survey instrument was guided by Neighbourhood Environment Walkability Scale (NEWS), International Physical Activity and the Environment Network (IPEN), Neighbourhood Quality of Life Survey (NQLS), and International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003; Saelens et al., 2003a; Cerin et al., 2007).

Random sampling was used to recruit users from the four case study areas. Appendixes 4 and 5 present blank copies of the users and relevant professionals' questionnaires respectively, as designed by the author based on previous studies (Oppenheim, 1992; Foddy, 2001; Baker, 2003; Zeisel, 2006; Barrett and Finch, 2014), including making them brief, easy to read and understand, without bias or ambiguity, and amenable to self-completion.

4.3.1.1 Developing and piloting the questionnaires

Gilbert (2005) advised a pilot sample of 10-20 respondents for a survey of 2,000 respondents (i.e. 0.5-1% of the sample size), and Saunders et al. (2009) similarly recommended a minimum of ten. Pilot studies are often essential to establish that a questionnaire is well designed and will be able to achieve all the data gathering objectives of the primary survey. To ensure the validity of responses, it is often necessary to provide that the sample for a pilot survey is selected from, or approximates to, the actual sample of the main survey (Pole & Lampard, 2002). Two types of pilot study were deployed as explained in this subsection.

The questionnaire form was examined to identify any problems that could arise in understanding or interpreting the questions by the respondents, and to establish the reasons for such confusions. The pilot study in this section was carried out with 40 POS users by sending the questionnaire form via email to six assistants. Analysis of the pilot survey results provided useful insight into parts of the questionnaire that needed to be revised prior to the main survey. According to both constructive activities, some of the questions survey were rewriter, added or excluded to the final questionnaire prior to conducting the actual survey. These questions focused on measuring dimensions that the researcher has initially excluded, or that he had never thought about (e.g. concerning annual income). The reason behind neglecting such questions was because the security situation in Libya made people reticent to disclose financial information (e.g. due to fear of kidnapping). However, piloting the questionnaire showed that most participants expressed their disagreement with answering such questions.

The second pilot aimed to test the questionnaire survey of relevant professionals, with five Libyan students at the University of Wolverhampton who have a contextual knowledge of the case study area. Analysis of the pilot survey results provided useful vision into parts of the questionnaire that needed to be reviewed before the primary survey. From the feedback provided by respondents, some questions were reframed and the average time to complete one questionnaire was reduced from 25 to 15 minutes.

4.3.1.2 Sample size determination

In meaningful survey research it is impossible to survey all of the target population, thus recruiting a representative sample is essential. The question is how many participants are to be used in the survey so that the results are statistically reliable. Moreover, surveys normally measure a number of different variables, each requiring different measurement levels and consequently different sample size. For both users and professionals, it was ensured that respondents were either residents of Tripoli or that they worked in the Tripoli Municipality Area Council.

Some scholars recommend that the optimum sample size is 10 percent of the net population under consideration (Mitra and Lankford, 1999); naturally it is unfeasible to apply this rule of thumb for users of a city. Researches can use more precise statistical solutions, such as the sample size guide shown in Table 4.2, using a 95% confidence level, whereby in 95 out of 100 repetitions of the survey, the results will not differ more than ± 5% (Saunders et al., 2009). Practical examples of sampling based on this approach are shown in Table 4.3.

Table 4.2 Level of confidence and associated z-values

Level of Confidence	*z-value*
90% certain	1.65
95% certain	1.96
99% certain	2.57

Source: Saunders et al. (2009)

Table 4.3 Sample sizes for different population at a 95-confidence level

Population	*Sample size*
75000	382
100000	384
1000000	384
10000000	384

Source: Payne and McMorrisv (1975)

A total of 520 questionnaires for the users were distributed in the four case study areas (130 each), and 427 valid responses were collected, with a valid response rate as high as 80%. This research adopted Payne and McMorrisv's (1975) suggestion that, for populations above 100,000, a sample size of 384 is suitable for required accuracy and reliability. A total of 130 questionnaires were distributed for the relevant professionals (mostly architects, urban planners, and landscape architects) in Tripoli whose work involves them in various ways with the city's planning and POS design, and 108 valid responses were collected, a very high valid response rate of 83%.

4.3.1.3 Data analysis for User and Professional Questionnaire Surveys

The questionnaires organized in two parts, the first of which targeted users and covered:

- Descriptive statistical results.
- Results from testing the time spent in walking and revisiting the POS with the case study area, gender, age, and education level.
- Results from analysis of the users' needs to walk in POS.
- Results from analysis of barriers affecting users to walk in POS.
- Results from analysis of success factors affecting users to walk in POS.
- Conclusion and recommendations.

The second part targeting relevant professionals covered:

- Descriptive statistical results of experts and professionals.

- Results from analysis of the level of using walkable POS factors in Tripoli
- Barriers and facilitators relating to the creation of successful walkable public spaces in Tripoli.
- Success factors in W-POS in Tripoli.
- Conclusion and recommendations.

The data generated from the questionnaires survey were analysed using SPSS version 20.0. Data were initially subjected to a test for normality, which showed that it was approximately non-normally distributed. This was done using non-parametric statistical tests, such as Kruskal-Wallis test and Mann-Whitney U test.

- *Kruskal-Wallis test*

The Kruskal-Wallis (KW) test analysed differences between all four case study areas. It was chosen for two reasons: firstly, the dataset collected from the questionnaire does not fit standard normal distribution; and secondly, there are more than two independent groups for comparison. Julie Pallant (2010) defined the Kruskal-Wallis test (sometimes named as the Kruskal-Wallis H test) as "Non-parametric alternative to a one-way between-groups analysis of variance. It allows you to compare the scores on some continuous variable for three or more groups. It is similar in nature to the Mann-Whitney U Test presented earlier in this chapter, but it allows you to compare more than just two groups".

Inferential statistical analysis was carried out on the theme 'Reduced reliability on automobile use' using the Kruskal-Wallis test with Monte Carlo estimate of significance, with 99% confidence level, with case identity as the independent variable and 0.01 as the threshold significance level.

- *Mann-Whitney U test*

Mann-Whitney U test was chosen to identify differences between two independent area categories. Julie Pallant (2010) illustrated that "The use of the Mann-Whitney U Test was used to test for differences between two independent groups on a continuous measure. This test is the non-parametric alternative to the t-test for independent samples. Instead of comparing the means of the two groups, as in the case of the t-test, the Mann-Whitney U Test compares medians”.

- *Principal component analysis (PCA)*

PCA is frequently used for factor extraction from social data, specifically in the construction of environmental scales (Field, 2009; Pallant, 2010). It is a technique to compact the lower factors sets of data out of higher ones (Ilin and Raiko, 2010). Suhr (2005) notes that PCA is a variable reduction technique that can be used when variables are highly correlated. It reduces the number of observed variables to a smaller number of principal components, which account for most of the variance of the observed variables. It uses a large sample procedure. Leech et al. (2005) noted that PCA ‘focuses on data reduction and allows the researcher to determine which, of a large set of items “hang together” as a group, or are answered most similarly by the participants’.

Different authors in walkability studies have used PCA in a variety of ways. D’Arcy (2013) used principal component analysis in her thesis as the factor extraction method. Furthermore, Davies (2016) used PCA as the factor analysis method. In this research the PCA was selected because of its common use for factor extraction from social data (Leech et al., 2005). PCA is deployed as an ordination method to reduce the dimensionality of the datasets in this thesis, enabling easy comparison between the four case study areasby creating different key explanatory variables which are the principal components. Before using factor analysis, three tests were used to test if the data were appropriate:

- Cronbach’s alpha (α) coefficient is the most accepted method for testing the reliability of a scale. Cronbach’s alpha tests the reliability by measuring the correlations that exist for each possible way of splitting a set of items in half (Ryan, 1995).

- Kaiser-Meyer-Olkin (KMO) test was used to check the appropriateness of the factor model. This test compares ‘the magnitudes of the observed correlation coefficients with the magnitudes of the partial correlation coefficients’ (Malhotra, 2007). The good factor analysis threshold value is .60 (Tabachnick and Fidell, 1989). Horn’s parallel analysis (comparing eigenvalue size to a randomly generated dataset of the same size) was used to verify the number of sub-components, as the Kaiser test can overestimate the number of sub-components to be retained (Pallant, 2010).
- Apart from the sample size and variables number, it is essential for some of the variables to be correlated. If the correlations between the variables are small, factor analysis will not be appropriate (Malhotra, 2007).

4.3.2 Observation

The second tool in phase two used in data collection during the fieldwork was the qualitative method of observation. This tool was chosen because the researcher had to learn about the phenomenon in its context, in the field. It included the observation of the physical environment, and more important focus is in the observation of the walking behaviours. Marshall and Rossman (2015) described observation as ‘the systematic noting and recording of events, behaviour and artefacts (objects) in the social setting chosen for study’. Moreover, using observation as a tool in understanding social life within a particular space and relating that to space’s physical parameters has been used by many scholars (i.e. Jacobs, 1960; Whyte, 1980; Lynch, 1989; Low, 2000). Zeisel (1981) indicated the key elements in the observation of POS shown in Figure 4-2.

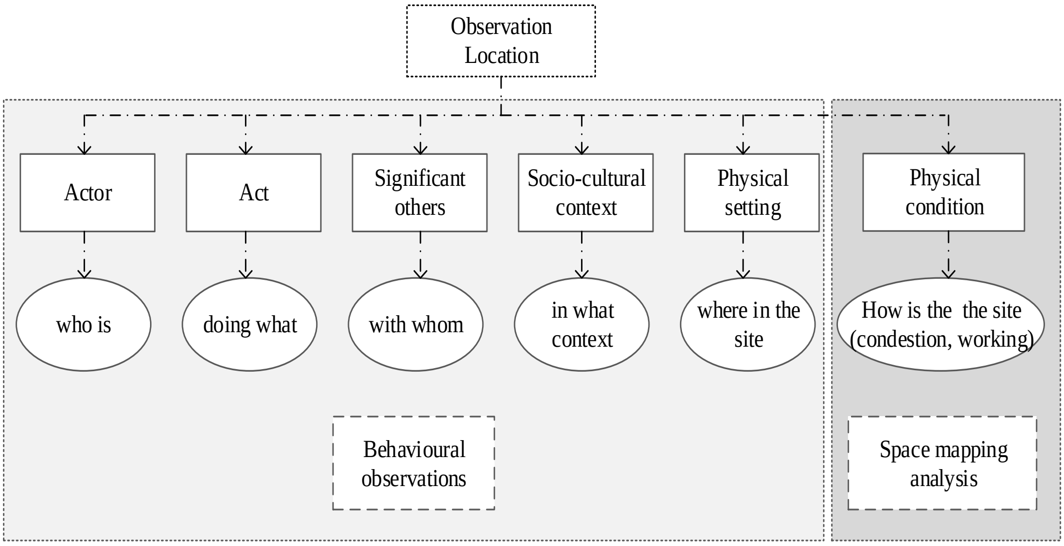


Figure 4-2 Key elements in the observation of public open spaces

Source: Zeisel (1981)

Furthermore, the observation involved spending 30 minutes at the four selected case studies at four different times of the day (morning, afternoon, evening, and night) twice on both weekdays and weekends, between 08:00 and 23:00. The tools used for observation were the camera for a taken photo, visual observations, behavioural map sheets, and pedestrian count recording sheets, as shown in Appendix 6. The observations also aimed to determine the user characteristics including:

- The total number of people using the study area as a ‘snapshot’ of four times a day, during a ten minute of one period (gender and age).
- The total number of children using the public space, with or without adults.
- The total number of prams.
- The total number of wheelchairs.
- The total number of people using the crosswalk.
- The total number of people not using a crosswalk (i.e. jay walking).
- The time and temperature.

The overall level characteristics of the pedestrian environment concern factors of:

- Accessibility (number of footpaths, availability of public transportation, number of significant barriers, number of bus services per day, linkage of transport modes, and ease of access for pedestrians).
- Pedestrian facilities (availability of disability infrastructure, availability of crossings, park or recreational facilities., street lighting, street furniture, and quality amenities in POS).
- Land use (residential, commercial, government offices, and recreational).
- Aesthetics (attractive architectural design presence of landscape, naturally beautiful places, availability of plazas and squares, and visual quality).
- Safety (street is well lit, signals help walkers' cross busy streets, public phones can be used for emergencies, heavy traffic along nearby streets, speed limits, driver behaviour, traffic light crossings enough to make walking pleasant, the disappearance of armaments, police presence, and CCTV).
- Convenience & comfort (place generally free from litter and clean, public toilets, ambient sound, air quality, the diversity of activities, continuity of pavements, pavement width, childrens' playgrounds, pavements maintained, shelter for protection from the weather and the sun, vehicle parking facilities, seating areas).

The observation in this study was conducted in four areas in Tripoli. Each case study's boundaries are clearly defined by the surrounding streets or buildings, as explained in detail in Chapter 7. They include all walkable public spaces types, including:

1. Omar Al-Mokhtar Street as low walkable open space with poor environment condition (LW/PC),
2. Martyrs' Square as high walkable open space with good environment condition (HW/GC),
3. Algeria Square as low walkable open space with good environment condition (LW/GC),

4. Al-Rasheed Street as high walkable open space with poor environment condition (HW/PC).

4.3.3 Focus group discussion (FGD)

The third tool in phase two used in data collection during the fieldwork was FGD, to validate the results from the questionnaire survey with data based on expert human judgment. The outcome of the validation process from the focus group was considered as reliable, and the reason behind that was that the people engaged in the focus group was a group of experts who had several years of experience in the area of POS, POS design and management. FGD formulated a more in-depth analysis by involving a number of government officials and users to understand their experiences about walkability, barriers limiting walkability in POS, and factors encouraging people to walk in POS. The FGD session had three tasks:

- To define and explain the barrier and success factors of walkability in LPOS.
- To provide a relaxed and semi-formal atmosphere that encouraged participants to discuss exhaustively all aspects of walkability in Tripoli.
- To update the research outcome and strategies after validation by the focus group participants.

This followed Hsu, Chang, and Lee's (2013) recommendation that FGD can validate tools or guidelines. In addition to that, the validation technique is a key part of the research result (policy/ model/ framework) development process; it increases confidence in the research result (policy/ model/ framework) and makes it more valuable (Kennedy et al., 2005).

One of the most common types of participatory research and action is the focus group discussion. Seale (2004) pointed out that focus groups could be used in exploring issues of audience reception, like in media and communication studies, to look at views and opinions of staff in the case if organisational research or in a more general sense. It could be used to study social and cultural attitudes on a range of issues as in the case if an interpretive study.

On the other hand, it could also be used to validate the framework and the results which have been done in this research. Participants in FGD were randomly drawn from a short list of experts in Tripoli. The main factors considered while selecting participants were their knowledge of the subject, participation in part two of the questionnaire survey (i.e. relevant professionals), and the diversity of the sectors they represent.

Glesne (2010) observed that FGD groups are generally composed of 7 to 10 people who are usually unfamiliar with one another and who have been selected because they share specific characteristics relevant to the research aims. FGD participants were invited to participate by sending a formal invitation letter and subsequently a telephone confirmation of attendance when requested by participants. The focus group in this study involved 15 participants in two (8 and 7) FGD sessions, all of whom have some experience related to data walkability and POS in Tripoli.

The sessions, facilitated by the author, started with a general introduction, and a small exercise was conducted to determine participants' levels of understanding of the subject . During the introductory discussions, participants in each session were divided into two groups of discussants, ensuring that people who might know each other were separated. The session was recorded by audio as well as video means for subsequent transcription, and small group activities were based on interactive team exercises. These exercises were completed and collected after each session, and feedback to the full group was recorded on flip charts.

The data gathered from the flip charts, transcripts, and handouts through the two sessions were then synthesised to provide an overall position of the entire focus groups on current walkability design, planning, management and maintenance practice in Tripoli. This was with a view to prescribing strategies and policy options for adapting global best practices to suit local conditions.

4.3.4 Validity and reliability

Validity and reliability are of the utmost importance in any research work, as it is essential to ensure that results have been collected in a methodologically and scientifically sound manner in order for them to be used seriously for further research or practice. In this research, the quantitative and qualitative methods were tested for reliability and validity. A pilot study was the first step in this thesis to carry out validity as the researcher used a pilot study to ascertain how well the questionnaire could serve the purpose of validating the result, as well as pilot observation to guide subsequent observation during the main fieldwork.

Reliability in quantitative studies means consistency or stability to measure something (Robson, 2011; Bryman, 2012). Conducive to ensure reliability, the questionnaire was designed on the basis of tested and proven measures. On the other hand, the Cronbach's alpha statistic test was widely used for reliability consistency in the social sciences. Cronbach's alpha checks the reliability and internal flexibility of the variables, which is based on the rationale that items measuring the same construct will highly correlate (Sharma, 2001; Hair et al., 2006). To achieve an acceptable level of internal reliability, the alpha coefficient must be at least 0.70 (Ryan, 2005; Akalin et al., 2009; Nunnally & Bernstein, 2010). Table 4.4 shows the results of Cronbach's alpha testing applied to the dataset used in this study from the main questionnaire survey (users).

Table 4.4 Cronbach's alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
.812	59

Source: Author

Validity is concerned with the integrity of the conclusions generated from a piece of research (Williams, 2006). Quinton and Smallbone (2006) defined validity as checking whether the objectives the researcher intended have been achieved or not. Yin (2011) illustrated that a study is valid only if has properly collected and interpreted its data so that the conclusions accurately reflect and represent the real world (or laboratory) that was studied. The validity of this study was assessed via the following steps.

Firstly, the intensive literature review on different data collection methods and the type of data (quantitative or qualitative) to be used was conducted, based on which this study selected several data collection methods, including Delphi method (all participants were experts in the field of POS and walkability), questionnaire, observations, and FGD. Also, walkability surveys such as NEWS and NQLS. that have already been extensively validated were selected in developing the research questionnaire.

Secondly, as explained earlier, published studies on walkability, POS, and public activities in general in Tripoli to provide a basis for comparison are critically scarce. However, the results and discussions from the preceding chapters of this thesis have confirmed that findings from this research are mostly supported by published literature from similar studies, including a similar study of Libyan cities by Mohamed (2013). This provides a basis for the internal validation of results from this investigation (Brinberg and McGrath, 1985).

Thirdly, piloting of questions was done during the first stage of data collection before the actual survey in the field, and validity was enhanced by consulting experts from other relevant professions during the development process. The validation of walkability indices in particularly can also be performed through field observations (Leslie et al., 2007). The observation sheets were piloted in Queen Street in Wolverhampton (UK) prior to the actual observations in Tripoli, taking into account obvious differences between these contexts.

Finally, through a sequential strategy, the researchers employed a quantitative approach that was qualitatively validated. This type of approach assists the researcher in cross-validating the relationships extracted between variables, since quantitative and qualitative approaches help to examine whether there is a convergence on a common construal of the issue (Fraenkel et al., 2012).

4.3.5 Triangulation

Triangulation is the use of mixed methods to determine the problem which is major strength in case study research (Yin, 2009). Jankowicz (2000) believes that, triangulation is possible when using more than one research method and the results from one method are cross checked with the outcomes of the other to achieve reliability and accuracy of the findings. The triangulation method was used to enable the researcher in comparing the findings. As seen in Figure 4-3 the overall approach to this study is a mixed methodology, which combines quantitative and qualitative methods, with a view to exploring walkability as understood from the review of literature presented in previous chapters. The dominant approach is quantitative, relying on data collection using a self-administered questionnaire for POS users and experts, designers, administrators, and professionals. It is supplemented by a qualitative method in the form of observations and expert FGD. Furthermore, the veracity of the results gained from quantitative methods are validated by a panel of experts, carried out using the qualitative method of FGD.

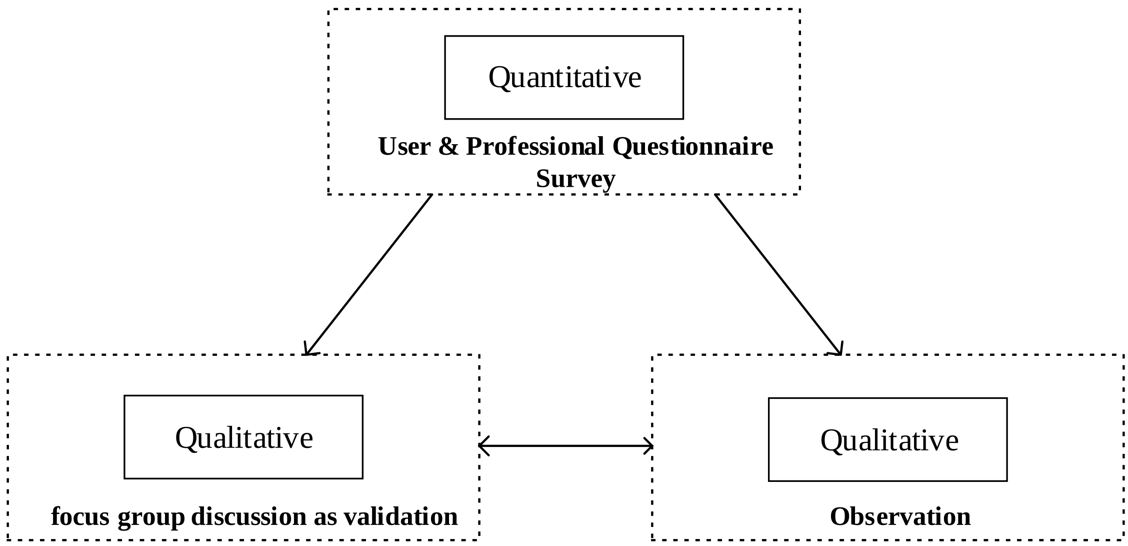


Figure 4-3 Triangulation of mixed research approach

Source: Author

4.4 Summary

This chapter provided a clear picture of the research methodology used in carrying out this thesis. Through a sequential strategy, the researcher employed a mixed method outlined below:

- Phase 1
    - Determination of walkable dimensions and case study areas selection relevant to Libyan context (Delphi method).
- Phase 2
    - Questionnaire survey for users and relevant professionals (qualitatively validated).
    - Observation.
    - Focus Group Discussion (FGD).

Chapter 5

Phase 1: Determining General Factors in Users Spending Time Walking and Revisiting Tripoli's POS

Two rounds of Delphi method were applied in this thesis. The Delphi method is a group facilitation technique. Which is a repeated multistage process designed to convert opinions into group consensus (Felicity et al., 2000). Delphi studies have been used for long- and short-range forecasting of future events to gain a consensus opinion or to emphasise differences of opinion and develop alternative future scenarios (Austin, 2015). Dalkey (1962) proved that decisions made by groups are generally more reliable than those made individually. Original Delphi method has been developed by Norman Dalkey of the RAND Corporation the in the 1950s, and it has been widely used since to establish objective consensus on complex issues (Keeney et al., 2011).

5.1 Overview

5.1.1 Delphi technique

This chapter explores the consistency and the validity of the 71 factors of walkability in POS identified from the literature review with regard to LPOS, particularly in Tripoli. Participants were selected at this stage by a number of strategies.

Firstly, the online survey website Survey-Monkey was used to host the survey, with invitations disseminated via Facebook pages to specialised professionals (e.g. town planners, architects, civil engineers, transport engineers, and urban designers). Participants who wished to participate voluntarily were asked to fill out the form in the survey link, with their phone number and email address to confirm the agreement.

Secondly, from an internet search of the University of Tripoli website, the emails of the academic staff listed in the School of Architecture and Civil Engineering were taken to invite them directly.

Thirdly, research assistants went to the Ministry of Utilities and Housing, Department of Planning Municipality of Tripoli, and the Urban Planning Department, to seek approval from the professionals to participate in this survey, through filling out the form, which included their names, email addresses and phone numbers.

5.1.2 Profile of respondents

This phase started by sending an email to 40 experts to invite them to participate in the survey; six refused to cooperate, seven did not respond, and a further two agreed to participate but subsequently did not (Table 5.1). Consequently, a total of 25 respondents participated in the Delphi study, a response rate of 62.5%. Clayton (1997) indicated that by the rule of thumb, 15 to 30 people are the norm for homogeneous groups (e.g. professors from the same discipline), and Gordon (1994) indicated that most Delphi studies use panels of 15 to 35 people.

Table 5.1 Delphi panel participation

Responses	*Members*	*Percentage*
Participants	25	62.5%
Refused to participate	6	15.0%
Said would participate but did not	2	5.0%
No response	7	17.5%
Total contacted	40	100.0%

Source: Author

The largest group of the experts specialised in architecture (40%), followed by 24% in transport planning, 16% in town planning, 12% in urban design, and 8% in landscaping. This section describes the findings from phase one, starting with a consideration of response rates and participant retention. In this phase those who agreed to participate comprised eleven academics from the University of Tripoli (44%); six from the Tripoli Municipality (24%), three from the interests of urban planning (12%), and one from the Ministry of Housing and Utilities (4%), who were treated as policy makers; and four were from the private sector (16%) (Table 5.2).

Respondents' experience ranged from six years to more than 25 (Table 5.2), with the professional group reporting the highest rate of more than 25 years (32%), followed by 20% with 6-10 years of experience, 16% with 20-25 years, 20% with 15-20 years, and 12% with 11-15 years. The majority of respondents held postgraduate qualifications (48% held a Master's degree, and 36% held a PhD), while 16% of respondents held only bachelor's degrees (Table 5.2). As shown in Figure 5-1, 68% of participants have published papers, books, or articles in this area of expertise.

Table 5.2 Respondent profiles

Characteristics		*Frequency (n = 107)*	*Percentage (%)*
Occupation	Architect	10	40.0%
	Town planner	4	16.0%
	Transport planning	6	24.0%
	Urban design	3	12.0%
	Landscaper	2	8.0%
Level of education	PhD	9	36.0%
	Master's	12	48.0%
	University graduate	4	16.0%
Place of work	Tripoli University	7	28.0%
	Tripoli Municipality Planning	6	24.0%
	Interests of Urban Planning	3	12.0%
	Ministry of Housing and Utilities as policy maker	2	8.0%
	Private sector	7	28.0%
Knows about walkability	Yes	24	96.0%
	Yes, I know a little	1	4.0%
	No	0	0.0%
Experience	From 6-10 years	5	20.0%
	From 11-15 years	3	12.0%
	From 15-20 years	5	20.0%
	From 20-25 years	4	16.0%
	More than 25 years	8	32.0%

Source: Author

Do you have any publications in this area?

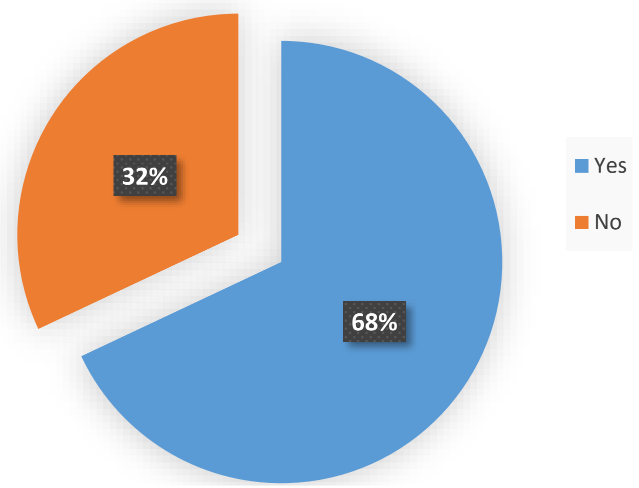


Figure 5-1 Publications in the area

Source: Author

5.1.3 Level of expert consensus

The agreement level considered to constitute consensus in the Delphi method is debatable, with applied thresholds of 51% (McKenna, 1989), 50-70% (Biondo et al., 2008), over 70% (Hasson et al., 2000), and 80% (Finger et al., 2006). In this phase, a statement was considered to have achieved consensus with the agreement of 70% or more, whereupon it did not enter the subsequent round. The nature of this phase is based on personal decisions, thus less than 70% agreement would represent a very low and risky statement to be practically applied. Furthermore, in both theoretical and practical issues, to assist any researcher in the management or business field, Delphi technique demands a response rate above 70% (Giannarou and Zervas, 2014). As shown in Table 5.3, a low consensus was reached with a result of 70-79% while medium consensus is between 80-89%, and consensus that falls between 90% and 100% is considered high consensus (Elgarhy, 2016).

Table 5.3 Level of experts' consensus

Low Consensus	70-79%
Moderate Consensus	80-89%
High Consensus	90-100%

Source: Author

5.2 Round one analysis

The first round of the Delphi survey is described in section 4.2.6. To briefly recapitulate, the aim was to generate as many perspectives on the focus areas as possible and to categorise responses in a manner that could be quantitatively analysed. An SPSS database was set up using the demographic labels as variables (e.g. years of experience, education level, a field of expertise, place of work, relevant publications, and knowledge of walkability). The data were entered into SPSS for each expert and linked to their codes.

According to the phase aim, detailed statistical data is presented by calculating averages, percentages, and frequency distributions (Zikmund and Babin, 1997). The benefit of this was making the result easy to interpret, and understand. No missing data was noted in the two rounds In round one, the open- ended questionnaires were divided into 71 potential indicators into the eight walkable POS dimension categories (Socio-demographic indicator, Mixed land use diversity, Accessibility, Company, Pedestrian facilities, Convenience & comfort, and Safety) and their individual mean scores, percentage agreement, and standard deviation. After completion of the first round over one month, data were coded and entered into a software. The scoring system for the statistical test required that each variable should be dichotomous (Pallant, 2013).

5.2.1 Factors of socio-demographic indicators

Participants were asked to choose the most important socio-demographic indicator that may affect users to walk in POS in Tripoli, and they were asked to write down another indicator not specified in the list that may affect this. The findings shown in Table 5.4 reveal that participants identified the major motivation for users to walk in POS in Tripoli by the socio-demographic indicators age, gender, education level, health problem, and auto ownership. The experts most commonly selected the following socio-demographic indicators as being associated with use of POS, in descending order of prevalence: education level (92%), age and auto ownership (each with 88%), gender (84%), and health problem (84%). The following factors were chosen to be continued into round two: age, gender education level of the respondent, health problem, and auto ownership.

Table 5.4 Round one, socio-demographic factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Agreement %*
Age	.88	.332	No/I don’t know	3	12.0%
			Yes	22	88.0%
Gender	.84	.374	No/I don’t know	4	16.0%
			Yes	21	84.0%
Ethnicity	.28	.458	No/I don’t know	18	72.0%
			Yes	7	28.0%
Education level	.92	.277	No/I don’t know	2	8.0%
			Yes	23	92.0%
Employment	.32	.476	No/I don’t know	17	68.0%
			Yes	8	32.0%
Per capita income	.48	.510	No/I don’t know	13	52.0%
			Yes	12	48.0%
Health problem	.84	.374	No/I don’t know	4	16.0%
			Yes	21	84.0%
Auto ownership	.88	.332	No/I don’t know	3	12.0%
			Yes	22	88.0%

Source: Author

5.2.2 Factors of mixed land use diversity

Participants were asked to choose the most important mixed land use diversity indicators that may affect in walkability use of POS in Tripoli and write another indicator not present in the list, as explained previously. Table 5.5 shows that 88% cited use of administrative and government offices, 84% cited residential and recreational land use (each), and 80% specified commercial use. In this question, all indicators were selected as relevant to be in round two (residential, commercial, administrative and government offices, and recreational).

Table 5.5 Round one, mixed land use factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Residential	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Commercial	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Administrative and government offices	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Recreational	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%

Source: Author

5.2.3 Factors of accessibility

Table 5.6 illustrates the findings from section C of the questionnaire. It can be seen that the accessibility category has 6 of its 11 indicators selected as relevant to be in next round, having achieved a minimum of 70.0% agreement of relevance, ranging between the lowest of 80.0% (Development patterns) to the highest of 88.0% (Number of footpaths, and Availability of public transportation). The indicators selected to be in round two are: Number of footpaths, Availability of public transportation, Getting to bus stop, Development patterns, Street connectivity (number of intersections within buffer), and Linkage of transport modes.

Table 5.6 Round one, accessibility factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Number of footpaths	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Availability of public transportation	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0`%
Getting to bus stop	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Number of significant barriers	.20	.408	No/I don't know	20	80.0%
			Yes	5	20.0%
Development patterns	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Regional accessibility	.40	.500	No/I don't know	15	60.0%
			Yes	10	40.0%
Street connectivity (number of intersections within buffer)	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Street pattern	.32	.476	No/I don't know	17	68.0%
			Yes	8	32.0%
Connectivity between uses	.24	.436	No/I don't know	19	76.0%
			Yes	6	24.0%
Number of daily bus services	.36	.490	No/I don't know	16	64.0%
			Yes	9	36.0%
Linkage of transport modes	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%

Source: Author

5.2.4 Factors of company

As Table 5.7 shows, for section D (company category), all indicators achieved low agreement (below 70%), thus all indicators for the company category were deleted and not carried to round two.

Table 5.7 Round one, company factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Walking with another person	.28	.458	No/I don't know	18	72.0%
			Yes	7	28.0%
Walking with pets	.20	.408	No/I don't know	20	80.0%
			Yes	5	20.0%
Number of relatives within the buffer	.28	.458	No/I don't know	18	72.0%
			Yes	7	28.0%

Source: Author

5.2.5 Factors of pedestrian facilities

Table 5.8 shows the findings from section E; the results show that five of the nine accessibility indicators were relevant and included in the next round, having achieved a minimum of 70% agreement of relevance ranging between the lowest of 80% (Disability infrastructure, Street furniture) to the highest of 84% (Availability of crossings, Street lighting). The indicators selected for round two were Disability infrastructure, Availability of crossings, Park or recreational facilities, Street lighting, and Street furniture.

Table 5.8 Round one, pedestrian facilities factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Presence of bicycle way	.28	.458	No/I don't know	18	72.0%
			Yes	7	28.0%
Disability infrastructure	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Availability of crossings	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Feed bus service	.20	.408	No/I don't know	20	80.0%
			Yes	5	20.0%
Park or recreational facility	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Street lighting	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Open sewers along walking path	.28	.458	No/I don't know	18	72.0%
			Yes	7	28.0%
Street furniture	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Quality amenities in public parks	.08	.277	No/I don't know	23	92.0%
			Yes	2	8.0%

Source: Author

5.2.6 Factors of convenience and comfort

As can be seen in Table 5.9, the Convenience and comfort category recorded the highest number of indicators selected for the second round of the Delphi survey, with 11 of its 17 indicators selected, with their percentage agreement above the cut-off points represented by the lowest agreement of 76% (Vehicle parking facilities) to the highest of 88% (Existence of public toilet, pavement width).

Table 5.9 Round one, convenience & comfort factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
This place generally free from litter and clean	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Variety of activities within buffer	.68	.476	No/I don't know	8	32.0%
			Yes	17	68.0%
Existence of public toilet	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Walking path modal conflict	.36	.490	No/I don't know	16	64.0%
			Yes	9	36.0%
Ambient sound and air quality	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Diversity of activities	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Continuity of pavements	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Pavement width	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Childrens' playgrounds	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
pavements maintained	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Shelter for protection from the weather and the sun	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Vehicle parking facilities	.76	.436	No/I don't know	6	24.0%
			Yes	19	76.0%
Seating areas	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%

Source: Author

5.2.7 Factors of safety and security

Table 5.10 shows that the Safety category has 7 of its 11 indicators chosen as relevant and to be in the next round. While their percentage agreement above the cut-off points is represented by the lowest agreement of 80% (Personal safety, Crosswalks in the middle of the street, Enough street lighting) to the highest of 88% (Risk of crimes in location, People present in roads). From the experts' answers, two options were added in the next round: Police presence in the street (88% agreement), and No manifestation of carrying weapons (92% agreement).

Table 5.10 Round one, safety factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Personal safety	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Risk of the crimes into this place	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Reported crimes	.24	.436	No/I don't know	19	76.0%
			Yes	6	24.0%
Road accidents	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Undesirable land use & activities	.16	.374	No/I don't know	21	84.0%
			Yes	4	16.0%
Abandoned buildings & lands	.12	.332	No/I don't know	22	88.0%
			Yes	3	12.0%
Safety: People present in roads	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Vehicle speed and separating between pedestrians and vehicles	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Crosswalks in the middle of the street	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Enough street lighting	.80	.408	No/I don't know	5	20.0%
			Yes	20	80.0%
Level of visibility	.40	.500	No/I don't know	15	60.0%
			Yes	10	40.0%

Source: Author

5.2.8 Factors of aesthetics

In this section from round one, the participants were asked to choose the most important aesthetic indicators that may affect walkability for users in POS in Tripoli, and they were asked to write down other indicators not in the given list that they considered to be relevant. Table 5.11 shows the lowest agreement of 76% for Landscaping treatments on either side of the road, and the highest of 92% for Attractive architectural design.

Table 5.11 Round one, aesthetic factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Attractive architectural and building design	.92	.277	No/I don't know	2	8.0%
			Yes	23	92.0%
Presence of street trees	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Number of places to exercise	.16	.374	No/I don't know	21	84.0%
			Yes	4	16.0%
Variety in routes	.16	.374	No/I don't know	21	84.0%
			Yes	4	16.0%
Narrow & crowded streets	.36	.490	No/I don't know	16	64.0%
			Yes	9	36.0%
Landscaping treatments either side of road	.76	.436	No/I don't know	6	24.0%
			Yes	19	76.0%
Naturally attractive places	.84	.374	No/I don't know	4	16.0%
			Yes	21	84.0%
Availability of plazas	.36	.490	No/I don't know	16	64.0%
			Yes	9	36.0%
Park intensity	.32	.476	No/I don't know	17	68.0%
			Yes	8	32.0%
Visual quality	.88	.332	No/I don't know	3	12.0%
			Yes	22	88.0%
Transparency of fronting structures	.44	.507	No/I don't know	14	56.0%
			Yes	11	44.0%
Coherence of built form	.40	.500	No/I don't know	15	60.0%
			Yes	10	40.0%

Source: Author

Figure 5-2 shows that the upper 70% of factors have been returned to the next round. For the second round, the Delphi questionnaire was constructed based on the feedback of the first round

5.2.9 Case study selection

Walkability in public open spaces in Tripoli city centre can be in four cases:

1. Highly walkable POS with a good environment condition.
2. Highly walkable POS with a poor environment condition.
3. Low walkable POS with a good environment condition.
4. Low walkable POS with a poor environment condition.

Those conditions were ascribed to selected different types of POS in Tripoli, to obtain a clearer idea about walkability in Tripoli. As explained in Chapter 4, in this stage the experts suggested the case studies' locations, and the experts were asked to select four places in Tripoli, subject to the following conditions:

- Could you select a highly walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?
- Could you select a highly walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?
- Could you select a poor walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?
- Could you select a poor walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?

Table 5.12 illustrates the frequencies and percentages resulting from the case study selection in round one.

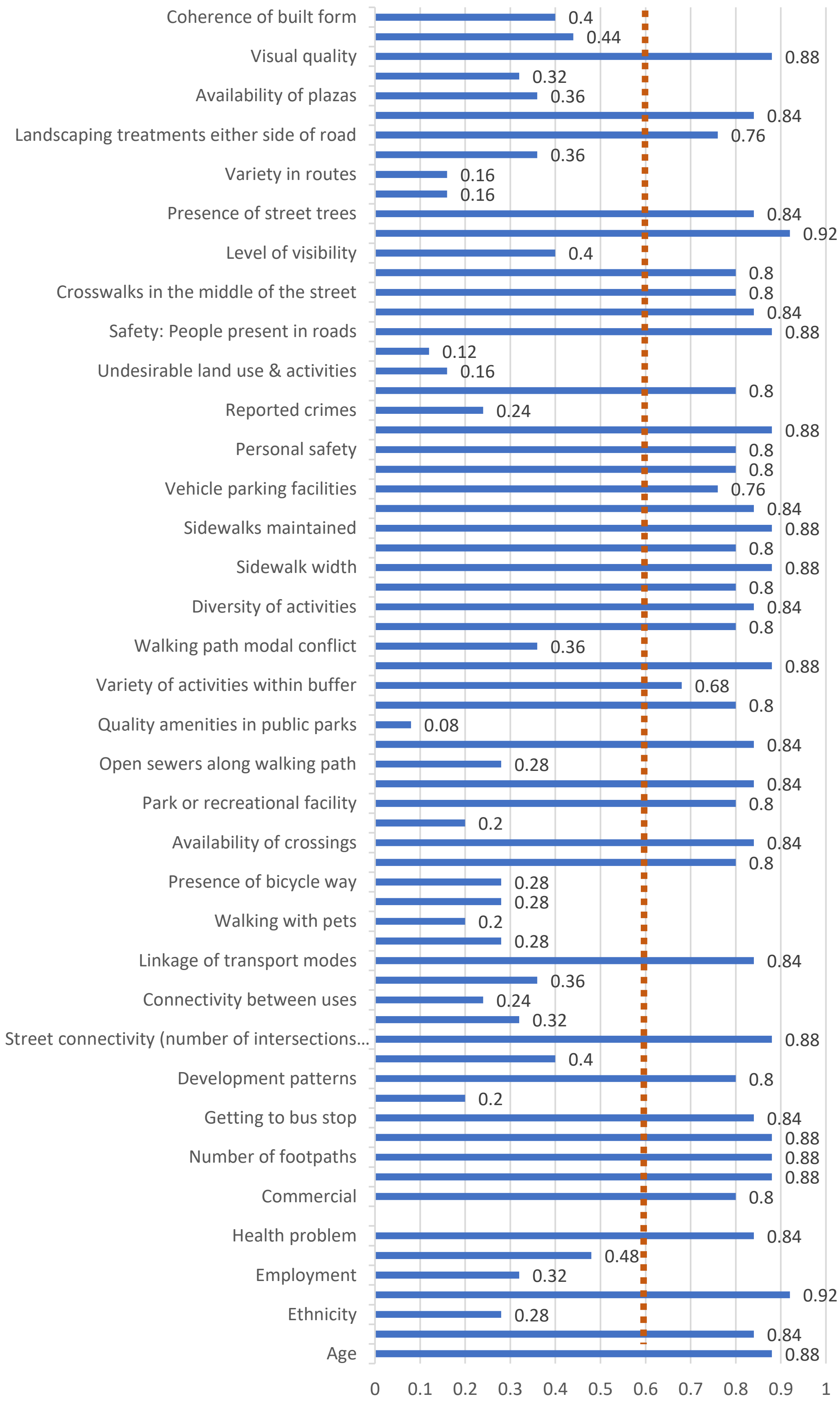


Figure 5-2 The Factors Upper 70%, Which Have Been Sent Back to the Experts

Source: Author

Table 5.12 Round one, case study selection

Question	*Place Name*	*Frequency*	*Percent*
Could you select a highly walkable area (a public square or street) in Tripoli city centre with good walkability conditions?	Martyrs Square	12	48%
	Algeria Square	8	32%
	24th December Street	3	12%
	Omar Al-Mokhtar Street	2	8%
Could you select a highly walkable area (a public square or street) in Tripoli city centre with poor walkability conditions?	Al-Rasheed Street	18	72%
	Algeria Square	4	16%
	Al-Aistiqlal	3	12%
Could you select poor walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?	Algeria Square	14	56%
	Al-Suehaliy Square	8	32%
	Mazran Street	2	8%
	Al-Rasheed Street	1	4%
Could you select poor walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?	Omar Al-Mokhtar Street	13	52%
	Algeria Square	9	36%
	Al-Aistiqlal	2	8%
	Martyrs' Square	1	4%

Source: Author

5.3 Round two analysis

Combinations of exploratory and descriptive research were used in round two of the Delphi study, with closed-ended questions. They were sent back to the first round participants on 22th July 2016. The aim of this round was to get comments and feedback and to ascertain agreement regarding the results. The second round was closed on the 18th October 2016. The findings were presented mainly in tabular form. The experts were invited to answer the questions on any aspect of the interim findings from round one, to get their agreement or disagreement, to suggest revisions and clarifications, or to add further information. All those who participated in the first round participated again in the second round; the evaluation of the second round responses was conducted using SPSS software version 20.0 to represent group opinion and consensus. A total of 25 experts replied to the second round (the response rate for the second round was 100% of those who participated in the first).

As in the initial analysis of round one, the analysis of the results of round two shows each question’s response as an individual response. Results with a mean of 4.0 and above were considered most essential and were selected as must impotent factors and will be in the next phase; correspondingly, factors with a mean of below 4.0 were not considered most essential and were not included in the subsequent phase. The participants were asked to rate their agreement with each listed factor of walkability in POS in terms of its effectiveness according to a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

5.3.1 Factors of socio-demographic

Of the 25 returned responses, 12 (44%) agreed and 14 (56%) strongly agreed that the factors of age and auto ownership effect walkability in POS in Tripoli, and 13 (52%) agreed and 11 (44%) strongly agreed on health problem, while neutral responses emerged for gender, education level and health problem, with no answers of strongly disagree or disagree (Table 5.13). Consequently, age, gender, education level, health problem and auto ownership were chosen as socio-demographic factors that may affect in walkability in POS in Tripoli, and they were used in the design of the questionnaire for the public survey.

Table 5.13 Round two, socio-demographic factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Age	4.56	.507	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	11	44.0%
			Strongly agree	14	56.0%
Gender	4.52	.586	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	10	40.0%
			Strongly agree	14	56.0%
Education level	4.48	.586	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	11	44.0%
			Strongly agree	13	52.0%
Health problem	4.40	.577	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	13	52.0%
			Strongly agree	11	44.0%
Auto ownership	4.44	.507	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	14	56.0%
			Strongly agree	11	44.0%

Source: Author

5.3.2 Factors of mixed land use

Table 5.14 shows the results related to essential traits in mixed land use that effaces POS in Tripoli city centre. Four mixed land use factors (Residential, Commercial, Administrative and government offices, and Recreational) reached consensus. Moreover, 96% agreement was obtained for the need for the mixed land use diversity, to be studied in the next phase with all factors that achieved a mean of 4.0 and above.

Table 5.14 Round two, mixed land use factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Residential	4.32	.557	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	15	60.0%
			Strongly agree	9	36.0%
Commercial	4.48	.586	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	11	44.0%
			Strongly agree	13	52.0%
Administrative and government offices	4.52	.510	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	12	48.0%
			Strongly agree	13	52.0%
Recreational	4.44	.507	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	14	56.0%
			Strongly agree	11	44.0%

Source: Author

5.3.3 Factors of accessibility

From the 25 experts in the second round, six factors of accessibility that may affect in walkability in Tripoli POS were approved (Table 5.15), and all factors reached the agreement of 96% to be included in the next phase, with all factors that achieved a mean of 4.0 and above. With this result, the Number of footpaths, Availability of public transportation, Getting to bus stop, Street connectivity (number of intersections within buffer), and Linkage of transport modes were chosen as accessibility factors that may affect walkability in LPOS, and were used in the public survey.

Table 5.15 Round two, accessibility factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Number of footpaths	4.44	.583	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	12	48.0%
			Strongly agree	12	48.0%
Availability of public transportation	4.40	.500	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	15	60.0%
			Strongly agree	10	40.0%
Getting to bus stop	4.44	.583	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	12	48.0%
			Strongly agree	12	48.0%
Development patterns	4.32	.476	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	17	68.0%
			Strongly agree	8	32.0%
Street connectivity (number of intersections within buffer)	4.36	.569	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	14	56.0%
			Strongly agree	10	40.0%
Linkage of transport modes	4.36	.490	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	16	64.0%
			Strongly agree	9	36.0%

Source: Author

5.3.4 Factors of pedestrian facilities

Table 5.16 shows the results related to essential traits in pedestrian facilities in POS in Tripoli city centre. Five pedestrian facilities (Disability infrastructure, Availability of crossings, Park or recreational facilities, Street lighting, and Street furniture) reached consensus. The lowest agreement was 82% of participants affirming the need for pedestrian facilities.

Table 5.16 Round two, accessibility factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Disability infrastructure	4.48	.510	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	13	52.0%
			Strongly agree	12	48.0%
Availability of crossings	4.12	.526	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	2	8.0%
			Agree	18	72.0%
			Strongly agree	5	20.0%
Park or recreational facility	4.24	.597	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	2	8.0%
			Agree	15	60.0%
			Strongly agree	8	32.0%
Street lighting	4.04	.539	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	3	12.0%
			Agree	18	72.0%
			Strongly agree	4	16.0%
Street furniture	4.36	.490	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
				16	64.0%
				9	36.0%

Source: Author

5.3.5 Factors of convenience and comfort

Table 5.17 shows that all eleven indicators from Convenience and comfort achieved agreement of over 70% to reach consensus in this Delphi round (Free from litter and clean, Existence of public toilet, Ambient sound and air quality, Diversity of activities, Continuity of pavements, pavement width, Childrens' playgrounds, pavemens maintained, Shelter for protection from the weather and the sun, Vehicle parking facilities, and Seating areas). The lowest agreement was 88% for the need for pedestrian facilities, to be studied the in next phase, achieving a mean of 4.0.

Table 5.17 Round two, convenience and comfort factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Free from litter and clean	4.36	.569	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	14	56.0%
			Strongly agree	10	40.0%
Existence of public toilet	4.20	.764	Strongly disagree	0	0.0%
			Disagree	1	4.0%
			Neutral	2	8.0%
			Agree	13	52.0%
			Strongly agree	9	36.0%
Ambient sound and air quality	4.36	.569	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	14	56.0%
			Strongly agree	10	40.0%
Diversity of activities	4.52	.510	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	12	48.0%
			Strongly agree	13	52.0%

Source: Author

Table 5.17 Round two, convenience and comfort factors (cont.)

Factors	Mean	Std D	Answer	Frequency	Percent
Continuity of pavements	4.20	.577	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	2	8.0%
			Agree	16	64.0%
			Strongly agree	7	28.0%
Pavement width	4.16	.624	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	3	12.0%
			Agree	15	60.0%
			Strongly agree	7	28.0%
Childrens' playgrounds	4.20	.500	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	18	72.0%
			Strongly agree	6	24.0%
Pavements maintained	4.36	.569	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	14	56.0%
			Strongly agree	10	40.0%
Shelter for protection from the weather and the sun	4.28	.542	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	16	64.0%
			Strongly agree	8	32.0%
Vehicle parking facilities	4.28	.510	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	13	52.0%
			Strongly agree	12	48.0%
Seating areas	4.36	.490	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	16	64.0%
			Strongly agree	9	36.0%

Source: Author

5.3.6 Factors of safety and security

Table 5.18 illustrates the results for the nine safety factors in walkable POS in Tripoli. All factors achieved over 70% agreement and were selected to be in the public questionnaire survey (Personal safety, Risk of crimes in location, People present in roads, People present in roads, Vehicle speed and separating between pedestrians and vehicles, Crosswalks in the middle of the street, Enough street lighting, Police presence in the street, and No manifestation of carrying weapons).

Table 5.18 Round two, safety factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Personal safety	4.40	.577	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	13	52.0%
			Strongly agree	11	44.0%
Risk of the crimes into this place	4.48	.653	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	2	8.0%
			Agree	9	36.0%
			Strongly agree	14	56.0%
Road accidents	4.56	.507	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	11	44.0%
			Strongly agree	14	56.0%
People present in roads	4.40	.500	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	15	60.0%
			Strongly agree	10	40.0%
Vehicle speed and separating between pedestrians and vehicles	4.36	.490	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	16	64.0%
			Strongly agree	9	36.0%

Source: Author

Table 5.18 Round two, safety factors (cont.)

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Crosswalks in the middle of the street	4.36	.569	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	14	56.0%
			Strongly agree	10	40.0%
Enough street lighting	4.40	.577	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	13	52.0%
			Strongly agree	11	44.0%
Police presence in the street	4.32	.476	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	17	68.0%
			Strongly agree	8	32.0%
People carrying weapons	4.32	.476	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	17	68.0%
			Strongly agree	8	32.0%

Source: Author

5.3.7 Factors of aesthetics

Table 5.19 shows the results related to essential traits in aesthetic of POS effaces in walkability in Tripoli city centre. Five aesthetic facilities (Attractive architectural and building design, Presence of street trees, Landscaping treatments either side of road, Naturally attractive places, and Visual quality) reached consensus. The lowest agreement was 96% of participants with the need for the aesthetics of POS to be studied in next phase, with factors achieving a mean of 4.0.

Table 5.19 Round two, aesthetic factors

Factors	*Mean*	*Std D*	*Answer*	*Frequency*	*Percent*
Attractive architectural and building design	4.48	.510	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	13	52.0%
			Strongly agree	12	48.0%
Presence of street trees	4.32	.557	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	15	60.0%
			Strongly agree	9	36.0%
Landscaping treatments either side of road	4.24	.436	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	19	76.0%
			Strongly agree	6	24.0%
Naturally attractive places	4.40	.577	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	1	4.0%
			Agree	13	52.0%
			Strongly agree	11	44.0%
Visual quality	4.32	.476	Strongly disagree	0	0.0%
			Disagree	0	0.0%
			Neutral	0	0.0%
			Agree	17	68.0%
			Strongly agree	8	32.0%

Source: Author

5.3.8 Case study selection round two

From round one, seven places were suggested as case studies in Tripoli city centre to be in round two (which were the highs chosen in the first round, as shown in Table 5.20). These seven places were sent again to the experts to suggested from the list four case studies as subject to the following conditions:

1. Could you select a highly walkable area (a public square or street) in Tripoli city centre with good walkability conditions?
2. Could you select a highly walkable area (a public square or street) in Tripoli city centre with poor walkability conditions?
3. Could you select poor walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?
4. Could you select poor walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?

Table 5.20 illustrates the results from this section, resulting in the selection of the following case study areas within Tripoli:

1. Martyrs Square was selected as a highly walkable POS with good walkability conditions (84% agreement).
2. Al-Rasheed Street was selected as a highly walkable POS with poor walkability conditions (96% agreement).
3. Algeria Square was selected as a poor walkable area with good walkability conditions (80% agreement).
4. Omar Al-Mokhtar Street was selected as a poor walkable area with poor walkability conditions (92% agreement).

Table 5.20 Round two, final case study selection

Question	*Place Name*	*Frequency*	*Percent*
Could you select a highly walkable area (a public square or street) in Tripoli city centre with good walkability conditions?	Martyrs Square	21	84%
	Algeria Square	4	16%
Could you select a highly walkable area (a public square or street) in Tripoli city centre with poor walkability conditions?	Al-Rasheed Street	24	96%
Could you select low walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?	Algeria Square	20	80%
	Al-Suehaliy Square	5	20%
Could you select low walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?	Omar Al-Mokhtar Street	23	92%
	Algeria Square	2	8%

Source: Author

5.4 Summary

The purpose of this chapter was to determine the general factors influencing users' decisions to spend time walking and revisiting the POS in Tripoli. Figure 5-3 shows the result from this chapter, determining seven main dimensions which are (factors of socio-demographic, factors of mixed land use, factors of accessibility, factors of pedestrian facilities, factors of convenience & comfort, factors of safety and security and factors of aesthetic) and 45 factors derived from two Delphi method rounds. Additionally, the four case study areas were suggested in this phase (Martyrs Square as HW/GC, Al-Rasheed Street as HW/PC, Algeria Square as LW/GC, and Omar Al-Mokhtar Street as LW/PC). The rules of this chapter were used to develop the questionnaire surveys used in phase two, as discussed in the following chapter.

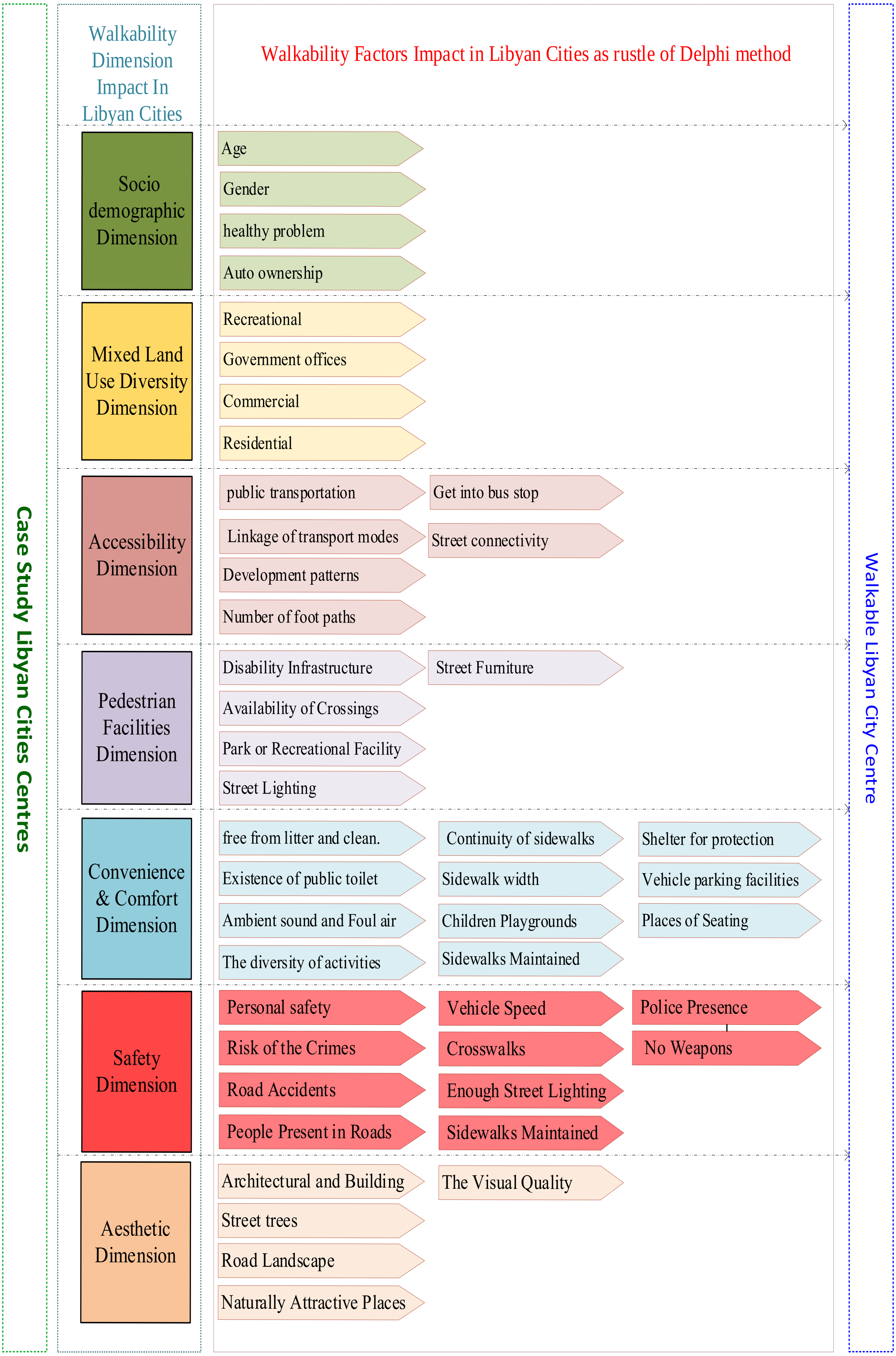


Figure 5-3 Delphi results on walkability factors impact in Libyan cities

Source: Author

Chapter 6

Phase 2: Users’ Perceptions of Public Open Spaces – Questionnaire Analysis

This chapter aimed to presents the data analysis of the users’ questionnaire surveys as the first part of this chapter, together with the experts and professional questionnaire surveys as the second part of this chapter. The questionnaire surveys were carried out between November 2016 and January 2017. The chapter is organised in two parts, covering the user- and professional-related questionnaire items, as described in section 4.3.1.3.

6.1 User questionnaire analysis

6.1.1 Case study rating

Since one of the core issues of the study is to evaluate the walkability in the POS in Tripoli, it is essential to select the case study areas carefully, as achieved in phase one. Moreover, Chapter 7 explains more detailed information about the case study areas: Omar Al-Mokhtar Street (OMS, LW/PC); Martyrs’ Square (MS, HW/GC); Algeria Square (AS, LW/GC); and Al-Rasheed Street (RS, HW/PC). All four case study locations returned a total of 427 responses (Figure 6-1), including AS (26%, n = 111), MS (25%, n = 109), RS (24%, n = 105) and OMS (23%, n = 102).

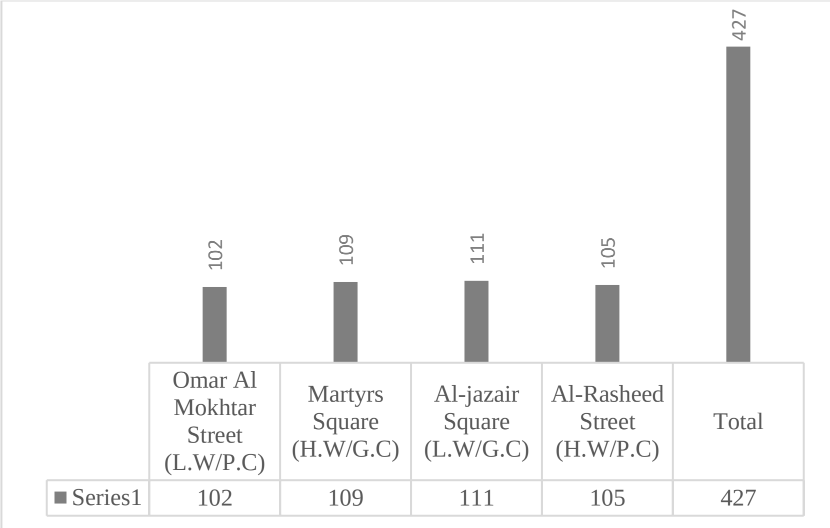


Figure 6-1 Number of respondents in each case study area

Source: Author

6.1.2 Case study areas and time spent in walking

People have different preferences when it comes to the time spent in public spaces walking, which differ from one case study to another because of contextual factors. Each case study site has a function, location, and environment conditions, as well as particular circumstances of each of the 427 respondents. Table 6.1 shows that 50% of the respondents in both OMS and MS spent 30 minutes or less for the time they spend walking in the POS, while almost 37 % of respondents in AS and RS selected more than 60 minutes (respectively). It should be noted that RS is one of the most famous shopping areas in Tripoli.

Table 6.1 Maximum length of time spent in location

Cross-tabulation					
Maximum length of time spent in location		Case Study			
		OMS (LW/PC)	MS (HW/GC)	AS (LW/GC)	RS (HW/PC)
30 minutes or less	Count	51	54	32	32
30 minutes to 1 hour	Count	24	26	36	35
60^{+} minutes	Count	27	29	43	38

Source: Author

Kruskal-Wallis test was applied to examine whether people have different opinions about the time they spend in walking according to case study areas. Table 6.2 shows a statistically significant relationship between the two variables (H = 3) 15.048, $p < .05$. Post-hoc tests using Mann-Whitney test were done in this section to determine the significant differences between time spent walking in the case study areas. The results illustrate that there is a statistically significant difference for the time spent in walk according to the case study area, where the statically significant has been recorded between OMS and AS (P = 0.004), and between OMS and RS (P = 0.011), as well as between MS and AS (P = 0.004), finely between MS and RS (P = 0.011). In addition, the results indicated that each public space has characteristics that distinguish it from others, which is why people may prefer to walk for a long time in one and not in another site.

Table 6.2 Kruskal-Wallis test

Test Statistics[a,b]	
	Maximum length of time spent walking in location
Chi-Square	15.048
df	3
Asymp Sig	.002
a Kruskal-Wallis Test	
b Grouping Variable: Case Study	

Source: Author

6.1.3 Gender and time spent in walking

Gender structure strongly shapes the Libyan society. According to the Bureau of Statistics and Census-Libya (2010), there are slightly more males than females in the total population (49.81% to 49.31%). Questionnaire analysis reveals that gender distribution among participants was approximately equal n = 213 (49.9%) male; n = 215 (50.1%) female). Table 4.3 shows the gender sample size in each case study, as summarised below:

- OMS: male: n = 51 (50%), female n = 51 (50%).

- MS: male: n = 58, (53%), female: n = 51 (47%).
- AS: male: n = 54 (47%), female: n = 57 (47%).
- RS: male: n = 50 (48%), female: n = 55 (52%).

Table 6.3 represents the distribution of total respondents to the main questionnaire survey according to time spent in walk and gender. It can be seen that 30 minutes to 1 hour has the least number of respondents, with almost 28%, while 30 minutes or less was selected by the largest proportion of approximately 40%. According to gender, most male respondents do not like to walk for a long time, with approximately 20% of all male respondents choosing 30 minutes or less, compared to 20% female respondents each for 30 minutes or less and more than 60 minutes. These results suggest that women prefer to spend more time walking in the study areas. This is likely related to sociocultural factors, such as relatively lower rates of drivers among women and two of the case study sites being commercial areas.

Table 6.3 Gender and maximum length of time spent walking in location

Cross-tabulation					
Case Study	Gender		Maximum length of time spent walking in location		
			30 minutes or less	30 minutes to 1 hour	More than 60 minutes
OMS (LW/PC)	Male	Count	25	18	8
		% Gender	49.0%	35.3%	15.7%
	Female	Count	26	6	19
		% Gender	51.0%	11.8%	37.3%
		% Gender	50.0%	23.5%	26.5%
MS (HW/GC)	Male	Count	31	17	10
		% Gender	53.4%	29.3%	17.2%
	Female	Count	23	9	19
		% Gender	45.1%	17.6%	37.3%
AS (LW/GC)	Male	Count	15	19	20
		% Gender	27.8%	35.2%	37.0%
	Female	Count	17	17	23
		% Gender	29.8%	29.8%	40.4%
RS (HW/PC)	Male	Count	14	21	15
		% Gender	28.0%	42.0%	30.0%
	Female	Count	18	14	23
		% Gender	32.7%	25.5%	41.8%
Total	Male	Count	85	75	53
		% Gender	39.9%	35.2%	24.9%
	Female	Count	84	46	84
		% Gender	39.3%	21.5%	39.3%
	Total	Count	169	121	137
		% Gender	39.6%	28.3%	32.1%

Source: Author

Kruskal-Wallis test was carried out to determine the degree of association between time spent for walk and gender. Table 6.4 shows no statistically significant relationship between the two variables (H = 1) 3.016, $p > 0.05$.

Table 6.4 Kruskal-Wallis test between gender and time spent in walking

Test Statistics[a,b]	
	Maximum length of time spent walking in location
Chi-Square	3.016
df	1
Asymp Sig	.082
a Kruskal-Wallis Test	
b Grouping Variable: Gender	

Source: Author

6.1.4 Age and time spent in walking

According to Bureau of Statistics and Census-Libya (2010), the majority of Libyans are below 65 years old, 31% of the population are below the age of 15, and approximately 63% of the population is aged between 15-64 years. Among participants, Table 6.5 shows that 37 (36%) of OMR users were aged 40-49 years, while the age cohort 30-39 was prevalent for 42 (38.5%) of MS users, 42 (37.8%) of AS users, and 42 (40.0%) of RS users.

location displays data that categorises the 427 of the respondents in terms of age and the time spent in walking in case studies. 12% of the group aged 40-49 selected 30 minutes or less spent for a walk, while for the cohort aged 30-39, approximately 12% chose 30 minutes to 1 hour, and 13% selected more than 60 minutes. Almost 40% of all respondents selected 30 minutes or less for walking, and approximately 28% of all the respondents selected 30 minutes to 1 hour for walking, and 32% of all respondents selected more than 60 minutes. Accordingly, people of different age groups have different preferences in the time they prefer to spend walking.

Table 6.5 Age, maximum length of time spent walking in location

Cross-tabulation				
Case Study	Age	Maximum length of time spent walking in location		
		30 minutes or less	30 minutes to 1 hour	60^+ minutes
OMS (LW/PC)	18-29	54.2%	16.7%	29.2%
	30-39	40.0%	24.0%	36.0%
	40-49	56.8%	21.6%	21.6%
	50-59	50.0%	33.3%	16.7%
	60^+	25.0%	50.0%	25.0%
MS (HW/GC)	18-29	45.5%	18.2%	36.4%
	30-39	33.3%	35.7%	31.0%
	40-49	73.9%	13.0%	13.0%
	50-59	70.0%	20.0%	10.0%
	60^+	100.0%	-	-
AS (LW/GC)	18-29	22.9%	31.4%	45.7%
	30-39	19.0%	33.3%	47.6%
	40-49	25.0%	50.0%	25.0%
	50-59	80.0%	-	20.0%
	60^+	75.0%	25.0%	-
RS (HW/PC)	18-29	20.0%	24.0%	56.0%
	30-39	28.6%	38.1%	33.3%
	40-49	36.0%	40.0%	24.0%
	50-59	37.5%	25.0%	37.5%
	60^+	60.0%	20.0%	20.0%
Total	18-29	35.0%	23.1%	41.9%
	30-39	29.1%	33.8%	37.1%
	40-49	49.5%	29.5%	21.0%
	50-59	60.0%	20.0%	20.0%
	60^+	57.1%	28.6%	14.3%
	Total	39.6%	28.3%	32.1%

Source: Author

Kruskal-Wallis test was carried out to determine the degree of association between times spend for walk and gender. As shown in Table 6.6, the results indicated a statistically significant relationship between the two variables (H = 4) 23.452, $p < .05$. Post-hoc Mann-Whitney testing was applied to determine the significant differences between time spent walking and age group. A significant difference was found in age between the results of Mann-Whitney test, and the results illustrate statistically significant differences in walking duration between people aged 18-29 and 40-49 years old (P = 0.003); between 18-29 and 40-59 years old (P = 0.004); between 18-29 and more than 60 years old (P = 0.045). Statistically insignificant differences were found between those aged 30-39 and 40-49 years old (P = 0.000); 30-39 and 50-59 years old (P = 0.001); and 30-39 and more than 60 years old (P = 0.027). The results of the Mann-Whitney test shows there are different perspectives about the time people prefer to spend walking in public spaces according to age.

Table 6.6 Kruskal-Wallis test for age and time spent in walking

Test Statistics[a,b]	
	Maximum length of time spent walking in location
Chi-Square	23.452
df	4
Asymp Sig	.071
a Kruskal-Wallis Test	
b Grouping Variable: Age	

Source: Author

6.1.5 Education and time spent in walking

Education level is one of the most significant users features the questionnaire looked at. Table 6.7 indicates that the most prevalent levels of education among participants were bachelor’s degree and high school, with approximately 37% each. The qualification background of participants was different between the case study areas. In OMS the highest number of participants had high school level (45%), while 47% in MS had high school level, 43% and 40% in AS and RS had a bachelor’s degree, respectively.

The relationship between education level and walking duration in public spaces is illustrated in Table 6.7. It can be seen that n = 169 of respondents selected 30 minutes or less. Approximately, 59% of the participants with elementary school level chosen 30 minutes or less, while 46% of the respondents with high school level selected 30 minutes or less, and 40% of the of the respondents with bachelor degree level selected more than 60 minutes, and approximately 42% of the respondents with post-graduate education selected more than 60 minutes.

Table 6.7 Education level, maximum length of time spent walking in location

Cross-tabulation				
Case Study	Education Level	Maximum length of time spent walking in location		
		30 minutes or less	30 minutes to 1 hour	60^{+} minutes
OMS (LW/PC)	Elementary School	46.2%	30.8%	23.1%
	High School	67.4%	17.4%	15.2%
	Bachelor Degree	36.0%	36.0%	28.0%
	Postgraduate	27.8%	16.7%	55.6%
MS (HW/GC)	Elementary School	41.7%	33.3%	25.0%
	High School	53.2%	19.1%	27.7%
	Bachelor Degree	50.0%	21.4%	28.6%
	Postgraduate	37.5%	50.0%	12.5%
AS (LW/GC)	Elementary School	71.4%	14.3%	14.3%
	High School	23.5%	44.1%	32.4%
	Bachelor Degree	18.8%	29.2%	52.1%
	Postgraduate	33.3%	33.3%	33.3%
RS (HW/PC)	Elementary School	70.6%	17.6%	11.8%
	High School	26.7%	43.3%	30.0%
	Bachelor Degree	22.5%	32.5%	45.0%
	Postgraduate	16.7%	33.3%	50.0%
Total	Elementary School	58.9%	23.2%	17.9%
	High School	45.9%	28.7%	25.5%
	Bachelor Degree	31.0%	29.0%	40.0%
	Postgraduate	27.1%	30.5%	42.4%
	Total	39.6%	28.3%	32.1%

Source: Author

Kruskal-Wallis test was carried out to determine the degree of association between times spend for walk and education level. As shown in Table 6.8, the results indicate a strong, statistically significant relationship between the two variables (H = 3) 22.865, $p < .05$. Post-hoc tests using Mann-Whitney test to determine the significant differences between time spent walking and education groups illustrated the following differences for time spent walking according to education level: elementary school and bachelor degree ($p = 0.000$), elementary school and postgraduate ($p = 0.000$), high school and bachelor degree ($p = 0.002$), and high school and postgraduate (0.004). About 40% of participants with postgraduate education spend more than an hour walking in public spaces, while approximately 59% of participants with elementary school education spent just 30 minutes or less. As a result of this section, the education level strongly affects people's perspective on the time they prefer to spend walking in public spaces.

Table 6.8 Kruskal-Wallis test between education and time spent in walking

Test Statistics[a,b]	
	Maximum length of time spent walking in location
Chi-Square	22.865
df	3
Asymp Sig	.000
a Kruskal-Wallis Test	
b Grouping Variable: Education Level	

Source: Author

6.1.6 Case study areas and revisiting POS

Different groups of people might like to visit or re-visit different POS. This section elaborates on different between case study areas and revisiting POS. A total of 427 people responded. As Table 6.9 shows, 28% of the respondents in OMS were visiting the street for the first time, and 27% of respondents visited OMS a couple of times a week. The majority (56%) of respondents in MS selected to visit the place every day or a couple of times a week, compared to 45% in AS. Finally, 45% of the participants in RS selected visit the place every day or a couple of times a week. Approximately half of all participants (427) in the four case study areas reported revisiting POS every day or a couple of times a week, and this is normal because the study sites are all located in the city centre, and many people go to walk every day through these areas.

Table 6.9 Case study areas and revisiting POS

Cross-tabulation						
Case Study	How often do you visit this place?					Total
	First time	Every day	A couple of times a week	A couple of times a month	Once a year or less	
OMS (LW/PC)	29	22	28	13	10	102
	28%	22%	27%	13%	10%	100%
MS (HW/GC)	25	39	22	12	11	109
	23%	36%	20%	11%	10%	100%
AS (LW/GC)	37	32	18	12	12	111
	33%	29%	16%	11%	12%	100%
RS (HW/PC)	30	23	24	14	14	105
	29%	22%	23%	13%	13%	100%
Total	121	116	92	51	47	427
	28%	27%	22%	12%	11%	100%

Source: Author

Kruskal-Wallis test was used to identify the significant difference between case study areas and revisiting POS. Table 6.10 shows no significant difference was identified between case study areas and frequency of visitation ($H = 0.528$), $p > 0.05$). Therefore, the different types of POS in Tripoli are not significant in revisiting the public spaces by users.

Table 6.10 Kruskal-Wallis test between case study areas and revisiting POS

Test Statistics[a,b]	
	How often do you visit this place?
Chi-Square	2.220
df	3
Asymp Sig	.528
a Kruskal-Wallis Test	
b Grouping Variable: Case Study	

Source: Author

6.1.7 Gender and revisiting POS

Table 6.11 represents the distribution of total respondents relating to question 2 (How often do you visit this place?). 27% of the male participants in OMS selected the first time, while just 14% of the female participants picked the first time. Also, 27% of the male participants in OMS have chosen a couple of times a month, and 78% of the female participants in OMS have chosen every day or a couple of times a week.

On the other hand, 69% of the male participants in MS, they visit Martyrs Square frequently. While, 60% of the female participants in MS, they always come to MS . Also, 54% of the male participants in AS, they visit it every day or couple of times a week. also 61% of the female participants in AS always visit Algeria Square. Finally, 68% of the male participants in RS have chosen every day or couple of times a week, whereas 55% of the female participants in RS selected every day, a couple of times a week.

Moreover, as the mean reason for users to visit the case study areas were shopping or working, this explains why more than half of the participants chose every day or a couple of times a week. Also, it is observed that the female participants were more likely to re-visit OMS and AS, which reflects that most government offices are located in these areas, and working women in Tripoli work more days and hours than their male counterparts (Bureau of Statistics and Census Libya, 2012).

Table 6.11 Gender, case study areas and revisiting POS

Cross-tabulation						
Case Study	Gender	How often do you visit this place?				
		First time	Every day	Couple of times a week	Couple of times a month	Once a year or less
OMS (LW/PC)	Male	27%	20%	18%	27%	8%
	Female	14%	27%	51%	2%	6%
MS (HW/GC)	Male	15%	41%	28%	9%	7%
	Female	24%	37%	23%	10%	6%
AS (LW/GC)	Male	36%	43%	11%	7%	2%
	Female	30%	40%	21%	7%	2%
RS (HW/PC)	Male	22%	44%	24%	8%	2%
	Female	29%	24%	31%	11%	5%
Total	Male	25%	37%	20%	13%	5%
	Female	24%	32%	31%	8%	5%

Source: Author

Kruskal-Wallis was used to identify the significant difference between case study areas and revisiting POS. Table 6.12 shows that no significant difference was determined between gender and frequency of visitation (H = 0.528), $p > 0.05$).

Table 6.12 Kruskal-Wallis gender and revisiting POS

Test Statistics[a,b]	
	How often do you visit this place?
Chi-Square	.015
df	1
Asymp Sig	.901
a Kruskal-Wallis Test	
b Grouping Variable: Gender	

Source: Author

6.1.8 Age and revisiting POS

Table 6.13 displays data that categorises the 427 respondents in terms of age and re-visiting the case study areas. 18% of the participants' group age 18-29 in OMS selected the first time, while approximately 20% the participants' group age 30-39 in OMS selected that they visit the place every day. Also, 24% of the participants' group age 40-49 in OMS selected a couple of times a week. On the other hand, almost 35% of all respondents in MS have chosen they visit MS every day, and approximately 29% of all respondents in AS selected they visit AS every day. Finally, around 45% of all respondents in RS have chosen they visit AS every day or a couple of times a week. Therefore, people of different age groups have a different reason for visiting the case study areas, so that is why there is diversity in some visits to the case study areas.

The Kruskal-Wallis results shown in Table 6.14 illustrate that there is a statistically significant difference for the means of re-visit the case study areas between the people who are age group 30-39 and 40-49 years old ($P = 0.004$), between are age groups 30-39 and 50-59 years old ($P = 0.001$), and 30-39 and 60 years old or more ($P = 0.012$). This indicated that users of different age groups have a different experience about revisiting the case study areas.

Table 6.13 Age, Case study areas and revisiting POS

Cross-tabulation						
Case Study	Age	How often do you visit this place?				
		First time	Every day	Couple of times a week	Couple of times a month	Once a year or less
OMS (LW/PC)	18-29	18%	-	2%	2%	1%
	30-39	4%	20%	-	-	-
	40-49	4%	1%	24%	2%	5%
	50-59	2%	-	1%	9%	-
	60 or more	-	-	-	-	4%
MS (HW/GC)	18-29	6%	12%	4%	5%	2%
	30-39	11%	12%	9%	3%	3%
	40-49	3%	9%	4%	3%	3%
	50-59	2%	3%	3%	-	2%
	60 or more	1%	-	-	-	-
AS (LW/GC)	18-29	10%	4%	5%	4%	7%
	30-39	13%	13%	7%	4%	1%
	40-49	7%	5%	3%	2%	1%
	50-59	1%	5%	1%	1%	2%
	60 or more	2%	2%	-	-	-
RS (HW/PC)	18-29	9%	6%	2%	3%	3%
	30-39	11%	7%	15%	7%	1%
	40-49	7%	7%	3%	2%	3%
	50-59	2%	2%	-	1%	3%
	60 or more	-	-	3%	-	2%

Source: Author

Table 6.14 Kruskal-Wallis test between age and revisiting POS

Test Statistics[a,b]	
	How often do you visit this place?
Chi-Square	17.885
df	4
Asymp Sig	.001
a Kruskal-Wallis Test	
b Grouping Variable: Age	

Source: Author

6.1.9 Education and revisiting POS

Table 6.15 shows that the 16% of the respondents in OMS who have high school selected the first time, also 24% of the participants in OMS who have chosen high school every day or a couple of times a week; 16% of the participants in MS who have high school and 16% of the respondents who have bachelor degree selected every day. In AS, 18% of participants in AS who have a bachelor's degree chose every day or a couple of times a week, and 17% with a bachelor's degree selected every day or a couple of times a week. Inhabitants used the POS in Tripoli city centre for different recreational activities, irrespective of their educational level.

Table 6.15 Education level, case study areas and revisiting POS

Cross-tabulation						
How often do you visit this place?						
Case Study	Education Level	First time	Every day	Couple of times a week	Couple of times a month	Once a year or less
OMS (LW/PC)	Elementary School	2%	2%	3%	2%	4%
	High School	16%	6%	14%	6%	3%
	Bachelor Degree	5%	9%	7%	2%	2%
	Postgraduate	5%	5%	4%	2%	1%
MS (HW/GC)	Elementary School	5%	2%	3%	-	2%
	High School	7%	16%	8%	5%	6%
	Bachelor Degree	9%	16%	7%	4%	2%
	Postgraduate	2%	2%	2%	2%	-
AS (LW/GC)	Elementary School	5%	5%	2%	-	1%
	High School	11%	7%	5%	4%	4%
	Bachelor Degree	13%	11%	7%	6%	6%
	Postgraduate	4%	5%	3%	1%	-
RS (HW/PC)	Elementary School	6%	4%	6%	-	1%
	High School	9%	9%	4%	4%	1%
	Bachelor Degree	8%	8%	9%	7%	7%
	Postgraduate	6%	1%	4%	2%	4%

Source: Author

Kruskal-Wallis was used to identify the significant difference between case study areas and revisiting POS. Table 6.16 shows that no significant difference was identified between education level and frequency of visitation ($H = 0.652$), $p > 0.05$).

Table 6.16 Kruskal-Wallis test between education level and revisiting POS

Test Statistics[a,b]	
	How often do you visit this place?
Chi-Square	1.631
df	3
Asymp Sig	.652
a Kruskal-Wallis Test	
b Grouping Variable: Education Level	

Source: Author

6.1.10 Main barriers prevent users to spend time for walk and revisiting POS

Table 6.17 shows results for a question that requested respondents to indicate how the listed barriers affecting time to spend walking and revisiting POS in Tripoli using a sliding scale of 1 to 5. A value of 1 implies the factor is a minor barrier while 5 implies factor is a major barrier to walk and revisiting POS in Tripoli. 60% of the respondents selected the high speed of traffic around POS, the high crime rate, the lack of facilities such as sports equipment, lack of disabled facilities, lack of physical facilities such as sitting facilities for sitting, eating etc., the lack of linkages to the majority places around Tripoli, and the lack of public transportation available as the significant barriers that prevent users from spending time walking in and revisiting POS.

As explained in section 4.22, PCA was selected as factor extraction method for this analysis because of its common use for factor extraction from social data (Leech et al., 2005). PCA was carried out on the 21 question variables. Table 6.17 shows the PCA results, which determine the barriers that play the most important prevent users to walk in POS. PCA is used here as an ordination method to reduce the dimensionality of the datasets in this section for easy comparison between the four case study areas, by creating different key explanatory variables which are the principal components.

Table 6.17 Barriers affecting time spent in walking and revisiting POS

Please use the scale to indicate how the following barriers affect walking and revisiting POS in Tripoli. A value of 1 will imply minor barrier while 5 implies factor is a major barrier to walk and revisiting POS in the city					
The mean barriers	1	2	3	4	5
It has no exclusive pathway for pedestrians	64 (15.0%)	107 (15.0%)	44 (10.3%)	146 (34.2%)	66 (15.5%)
The speed of traffic on most nearby roads is usually more than 25km/h	46 (10.8%)	77 (18.0%)	37 (8.7%)	176 41.2%)	9 (21.3%)
It has a high crime rate	58 (13.6%)	76 (17.8%)	31 (7.3%)	156 (36.5%)	106 (24.8%)
It is not well-lit at night	58 (13.6%)	76 (18.5%)	39 (9.1%)	163 (38.2%)	88 (20.6%)
It has few people walking at night, which makes me feel unsafe	91 (21.3%)	85 (19.9%)	22 (5.2%)	137 (32.1%)	92 (21.5%)
It has no pedestrian crossings lights to help me cross busy roads	52 (12.2%)	90 (21.1%)	51 (11.9%)	146 (34.2%)	88 (20.6%)
Shade is not available along the pathway and sitting areas (from trees, shelters, & buildings)	63 (14.8%)	107 (25.1%)	24 (5.6%)	136 (31.9%)	97 (22.7%)
It has no available facilities for doing different activities, such as sports equipment	51 (11.9%)	80 (18.7%)	32 (7.5%)	196 (45.9%)	68 (15.9%)
It has insufficient playgrounds and park or recreational facilities	62 (14.5%)	89 (20.8%)	34 (8.0%)	197 (46.1%)	4 (10.5%)
It has no disabled facilities	60 (14.1%)	92 (21.5%)	48 (11.2%)	178 (41.7%)	49 (11.5%)
It has no car parking	36 (8.4%)	106 (24.8%)	56 (13.8%)	149 (34.9%)	77 (18.0%)

Source: Author

Table 6.17 Barriers affecting time spent in walking and revisiting POS (cont.)

Please use the scale to indicate how the following barriers affect walking and revisiting POS in Tripoli. A value of 1 will imply minor barrier while 5 implies factor is a major barrier to walk and revisiting POS in the city					
The mean barriers	1	2	3	4	5
The pathway has major barriers, cracks, and other pavement condition issues	63 (14.8%)	86 (20.1%)	38 (8.9%)	206 (48.2%)	(34 8.0%)
It has no different facilities for sitting, eating etc.	49 (11.5%)	73 (17.1%)	42 (9.8%)	172 (40.3%)	91 (21.3%)
It has poor facades and poor building condition	68 (15.9%)	85 (19.9%)	71 (16.6%)	152 (35.6%)	51 (11.9%)
It has no a diversity in land use	40 (9.4%)	94 (22%)	51 (11.9%)	180 (42.2%)	62 (14.5%)
No enough different places for buying and selling goods	61 (3.7%)	81 (19.0%)	61 (14.3%)	192 (45.0%)	77 (18.0%)
Poor linkages to popular places around Tripoli	13 (3.0%)	77 (18.0%)	59 (13.8%)	190 (44.5%)	88 (20.6%)
No public transportation available	23 (5.4%)	75 (17.6%)	68 (15.9%)	182 (42.6%)	79 (18.5%)
It is not clean and there are insufficient garbage baskets	64 (15.0%)	101 (23.7%)	56 (13.1%)	156 (36.5%)	50 (11.7%)
It has no naturally attractive landscape	32 (7.5%)	101 (23.7%)	49 (11.5%)	167 (39.1%)	78 (18.3%)
The pavements/paths are not well maintained	40 (9.4%)	134 (31.4%)	49 (11.5%)	159 (37.2%)	45 (10.5%)

Source: Author

People walk in POS for different reasons, therefore it can be anticipated that diverse motives and barriers affect dimensions of their walking experience, including the duration of time they prefer and that they do spend walking in POS. Analysis of 21 variables embodied the convergence of six factors in six iterations of rotation that account for more than 48% of the total variance. The KMO measure (0.814) verified the sampling adequacy for the analysis. The percentages of variance for these factors as shown in Table 6.18, which are 18.288% (Q3_7, Q3_11, Q3_13, Q3_9, Q3_8, Q3_12, Q3_10), 7.643% (Q3_4, Q3_5, Q3_6, Q3_1, Q3_3, Q3_2), 6.387% (Q3_20, Q3_21, Q3_14), 5.942% (Q3_19, Q3_16), 5.159% (Q3_15, Q3_17), and 4.837% (Q3_18), respectively.

Table 6.18 Rotated component matrix for ‘barriers affect’ question

Rotated Component Matrix [a]						
	1	2	3	4	5	6
Q3_7: Shade is not available along the pathway and sitting areas (from trees, shelters, & buildings)	.691					
Q3_11: It has no car park	.685					
Q3_13: It has no seating and eating places	.556					
Q3_9: It has insufficient playgrounds and park or recreational facilities	.531					
Q3_8: It has no available facilities for doing different activities, such as sports equipment	.528					
Q3_12: The pathway has major barriers, cracks, and other pavement condition issues	.522					
Q3_10: It has no disabled facilities	.491					
Q3_4: It is not well-lit at night		.689				
Q3_5: It has few people walking at night, which makes me feel unsafe		.666				
Q3_6: It has no pedestrian crossings, and no cross lights to help me cross busy roads		.648				
Q3_1: Pavements in streets around were lacking		.613				
Q3_3: It has a high crime rate		.577				
Q3_2: The speed of traffic on most nearby roads is usually more than 25km/h		.563				
Q3_20: It has no naturally attractive landscape			.685			
Q3_21: Place not maintained (neglected)			.630			
Q3_14: It has poor facades and poor building condition			.438			
Q3_19: It is not clean and there are insufficient garbage baskets				-.698		
Q3_16: No enough different places for buying and selling goods				.595		
Q3_15: It has no a diversity in land use					.754	
Q3_17: Poor linkages to popular places around Tripoli					.520	
Q3_18: No public transportation available						.823

Source: Author

Table 6.19 shows that the following parallel analysis three of six components were retained, as their eigenvalues exceeded the corresponding data from the random sample. Figure 6-2 presents the actual eigenvalue from PCA and criterion value from parallel analysis, where factors 1, 2, and 3 exceed the criterion value from parallel analysis, thus they are retained, while factors 4, 5, and 6 are less than the criterion value from parallel analysis, thus they are not retained.

Table 6.19 Parallel analysis for 'barriers to walk and revisiting POS' correlates

Factor Component	Actual Eigenvalue from PCA	Criterion Value from Parallel Analysis	Decision
Factor 1	3.841	1.48	Retain
Factor 2	1.60	1.40	Retain
Factor 3	1.34	1.33	Retain
Factor 4	1.24	1.27	Do not retain
Factor 5	1.08	1.23	Do not retain
Factor 6	1.01	1.19	Do not retain

Source: Author (The retain factor determined by using Watkins (2000) Monte Carlo software recommended by Pallant (2010))

The choice of factors were based on Parallel analysis was carried out to compare eigenvalues from a randomly generated dataset of the same size using Watkins' (2000) computer software to the sub components generated from the PCA and Varimax rotation (The retain factor determined by using Watkins (2000) Monte Carlo software recommended by Pallant (2010) and it varies accordingly to the numbers of factors).

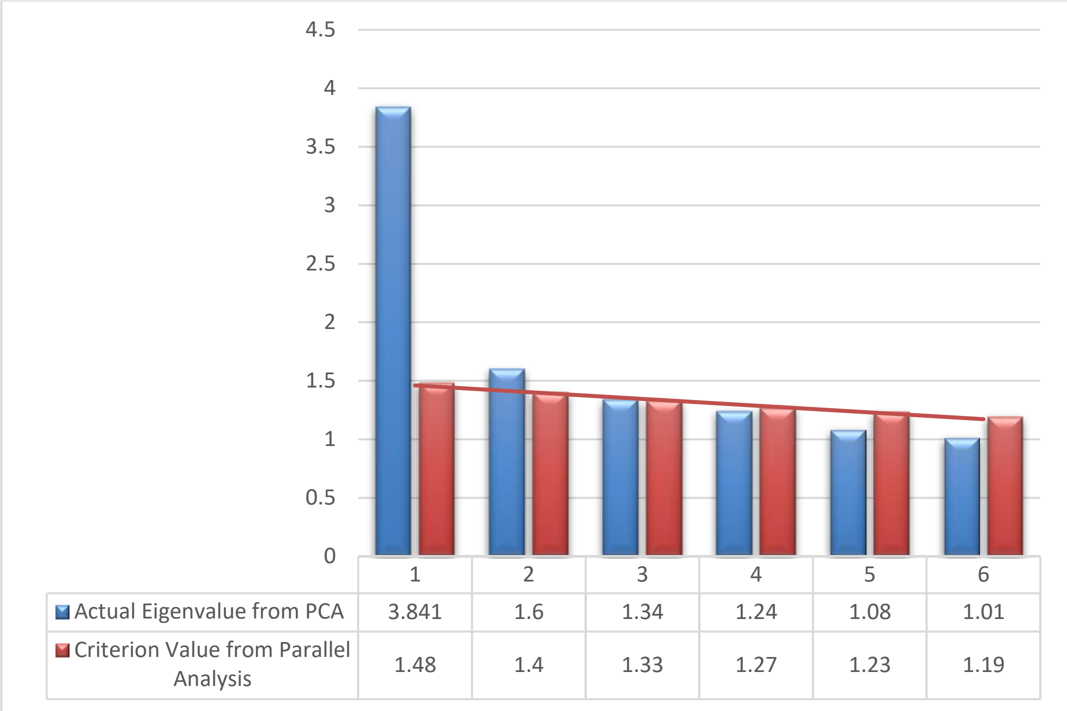


Figure 6-2 Actual eigenvalue from PCA and criterion value from parallel analysis

Source: Author

Table 6.20 presents the percentage variance for constructed components and their internal consistency scores for the generated scales. Safety elements and facilities elements all have alpha scores of over .8, which is ideal. On the other hand, the comfortable elements component has alpha scores below 0.7, and the number of items in this factor is less than ten. The alpha scores for factors can be small, so the interclass correlation coefficient (ICC) should also be measured. The ICC scores for the sub-component are within the optimal range of 0.2 to 0.4 (Pallant, 2010). Considering this information, the three generated sub-components were deemed suitable by the researcher. The three components identified from PCA presented in Table 6.20 are the items loaded with factors more than 0.4.

Table 6.20 Barrier component's properties

Component	# items	α	Variance Explained
Facilities barrier	7	.824	18.288%
Safety barrier	6	.770	6.387%
Aesthetic barrier	3	.402	5.942%

Source: Author

The first component, Facilities Elements Barrier (n = 7 α = .8), was constructed with the following items:

- Shade is not available along the pathway and sitting areas (from trees, shelters, & buildings).
- It has no car park.
- It has no seating and eating places.
- It has insufficient playgrounds and park or recreational facilities.
- It has no available facilities for doing different activities, such as sports equipment.
- The pathway has significant barriers, cracks, and other pavement condition issues.
- It has no disabled facilities.

The second component, Safety Elements Barrier (n = 6, α = .7), was constructed with the following items:

- It is not well-lit at night.
- It has few people walking at night, which makes me feel unsafe.
- It has no pedestrian crossings, and no cross lights to help me cross busy roads.
- Pavement s in streets around were lacking.
- It has a high crime rate.
- The speed of traffic on most nearby roads is usually more than 25km/h.

The third component, Aesthetic Elements Barrier (n = 3, α = .4), was constructed with the following items:

- It has no naturally attractive landscape.
- The place is not maintained (neglected).
- It has poor facades and poor building condition.

6.1.10.1 Correlations between barrier factors and POS walking duration

The results of Table 6.21 illustrate that the Facilities Barrier ($r = 0.813^{**}$, $p < 0.01$) and Safety Barrier ($r = 0.591^{**}$, $p < 0.01$) have a strong relationship with the time spent walking in POS, while Aesthetic Barrier ($r = 041$, $p < 0.01$) has a weak have a strong relationship with the time spent walking in POS. Consequently, all of these factors might be significant variables in making users walk in POS.

Table 6.21 Correlations between barrier factors and POS walking duration

Correlations		
Spearman's rho		Walking duration in public open space
Facilities barrier	Correlation coefficient	.852**
Safety barrier	Correlation coefficient	.591**
Aesthetic barrier	Correlation coefficient	.042

**.Correlation is significant at the 0.01 level (2-tailed).

Source: Author

6.1.10.2 Correlations between barrier factors and revisiting POS

The results in Table 6.22 show that Facilities Barrier ($r = 0.390^{**}$, $p < 0.01$) and Safety Barrier ($r = 0.290^{**}$, $p < 0.01$ have a strong relationship with revisiting POS, while Aesthetic Barrier ($r = 041$, $p < 0.01$) has weak relationship revisiting POS. It can be seen that the correlation between the first dependent variable (walking duration in POS) and three component factors are strong, while the correlation between second dependent variable (revisiting POS) with the same three components factors is less important, because people need good infrastructure and safe environment to spend a long time in POS, which is not available in Tripoli in this time (as explained in Chapter 7). While people sometimes re-visit the POS because they need to do their daily activities, as all of the case study areas are located Tripoli city centre, they are not primarily concerned about good infrastructure and the safety of the environment as much as in first dependent variable.

Table 6.22 Correlations between barrier factors and revisiting POS

Correlations		
Spearman's rho		How often do you visit this place?
Facilities barrier	Correlation coefficient	.390**
Safety barrier	Correlation coefficient	.290**
Aesthetic barrier	Correlation coefficient	.012

**.Correlation is significant at the 0.01 level (2-tailed).

Source: Author

6.1.11 Walkable public spaces in Tripoli

The main aim of this section is to come out with success factors that may have a high impact on users to spend a long time walking in POS, and to revisiting POS. Therefore the participants were asked 'Please use the scale to indicate the following factors will affect spend time for walking and revisit the POS: (1) strongly disagree (2) disagree (3) neither agree nor disagree (4) agree (5) strongly agree'. Table 6.23 and Figure 6-4 illustrate the descriptive analysis of the success factors from the users' perceptions.

The highest means were reported for improve public transportation (M = 4.37, agree 42.9% and strongly agree 48.0%), more social activities (M = 4.30, agree 33.7% and strongly agree 52.9%), privacy (M = 4.07, agree 47.8% and strongly agree 33.0%), more visible police presence (M = 3.90, agree 34.2% and strongly agree 35.1%) and more attention in safety and security (M = 3.89, agree 41.9% and strongly agree 31.1%).

The variables with the lowest means scores were walkable POS should have high quality architecture (M = 3.33, agree 29.3% and strongly agree 20.1%), walkable POS should have places for car parking (M = 3.23, agree 27.4% and strongly agree 23.2%), Provide convenience and comfort facilities such as public toilet, shelter etc. (M = 3.04, agree 32.6% and strongly agree 12.2%), and walkable POS should be clear of trash (M = 2.93, agree 23.0% and strongly agree 14.8%).

Table 6.23 Success factors affect in users to spend time for walk and revisit the POS

Please use the scale to indicate the following success factors that will affect spend time for walking and revisit the public open spaces: (1) strongly disagree (2) disagree (3) neither agree nor disagree (4) agree (5) strongly agree						
	Mean	1	2	3	4	5
Q4_1: Good links to other parts of the city by different types of public transport (e.g. taxi & bus)	4.37	1 (0.2%)	6 (1.4%)	32 (7.5%)	183 (42.9%)	205 (48.0%)
Q4_3: Walkable public open space should have diverse social activities for different age groups	4.30	14 (3.3%)	15 (3.5%)	28 (6.6%)	144 (33.7%)	226 (52.9%)
Q4_14: Walkable public open space should give people privacy by feeling boundaries between themselves and others	4.07	8 (1.9%)	13 (3.0%)	61 (14.3%)	204 (47.8%)	141 (33.0%)
Q4_7: More visible police presence	3.90	18 (4.2%)	25 (5.9%)	88 (20.6%)	146 (34.2%)	150 (35.1%)
Q4_9: More attention to people's personal safety and security	3.89	16 (3.7%)	31 (7.3%)	68 (15.9%)	179 (41.9%)	133 (31.1%)
Q4_11: Walkable public open space should have CCTV system	3.89	12 (2.8%)	32 (7.5%)	69 (16.2%)	191 (44.7%)	123 (28.8%)
Q4_13: Create more commercial activity around POS and create more mixed land use	3.82	18 (4.2%)	45 (10.5%)	65 (15.2%)	167 (39.1%)	132 (30.9%)
Q4_16: A public open space should include well-connected elements and give sufficient pedestrian moving opportunities	3.80	19 (4.4%)	31 (7.3%)	96 (22.5%)	151 (35.4%)	130 (30.4%)
Q4_5: Walkable public open space should have facilities for crossing the streets and reduce traffic speed in the vicinity	3.74	10 (2.3%)	39 (9.1%)	119 (27.9%)	144 (33.7%)	115 (26.9%)
Q4_2: Improve accessibility to the public spaces and other land use types, such as shops, public library, etc.	3.55	9 (2.1%)	50 (11.7%)	139 (32.6%)	157 (36.8%)	72 (16.9%)
Q4_17: Periodic maintenance of buildings and streets POS	3.45	32 (7.5%)	52 (12.2%)	124 (29.0%)	128 (30.0%)	91 (21.3%)

Source: Author

Table 6.23 Success factors affect in users to spend time for walk and revisit the POS (cont.)

Please use the scale to indicate the following success factors that will affect spend time for walking and revisit the public open spaces: (1) strongly disagree (2) disagree (3) neither agree nor disagree (4) agree (5) strongly agree						
	Mean	1	2	3	4	5
Q4_10: A public open space should have attractive views and elements, and soft landscaping such as green spaces and water elements	3.36	33 (7.7%)	79 (18.5%)	84 (19.7%)	164 (38.4%)	67 (15.7%)
Q4_4: Prevent traffic in some streets in the city centre, customized for walking	3.35	65 (15.2%)	96 (22.5%)	75 (17.6%)	139 (32.6%)	52 (12.2%)
Q4_8: Walkable public open space should have high quality architecture	3.33	44 (10.3%)	68 (15.9%)	104 (24.4%)	125 (29.3%)	86 (20.1%)
Q4_15: Walkable public open space should have historical significance	3.23	88 (20.6%)	41 (9.6%)	82 (19.2%)	117 (27.4%)	99 (23.2%)
Q4_12: Provide convenience & comfort facilities such as public toilet, shelter, car parking etc.	3.04	65 (15.2%)	96 (22.5%)	75 (17.6%)	139 (32.6%)	52 (12.2%)
Q4_6: Walkable public open space should be clear of trash	2.93	84 (19.7%)	85 (19.9%)	97 (22.7%)	98 (23.0%)	63 (14.8%)

Source: Author

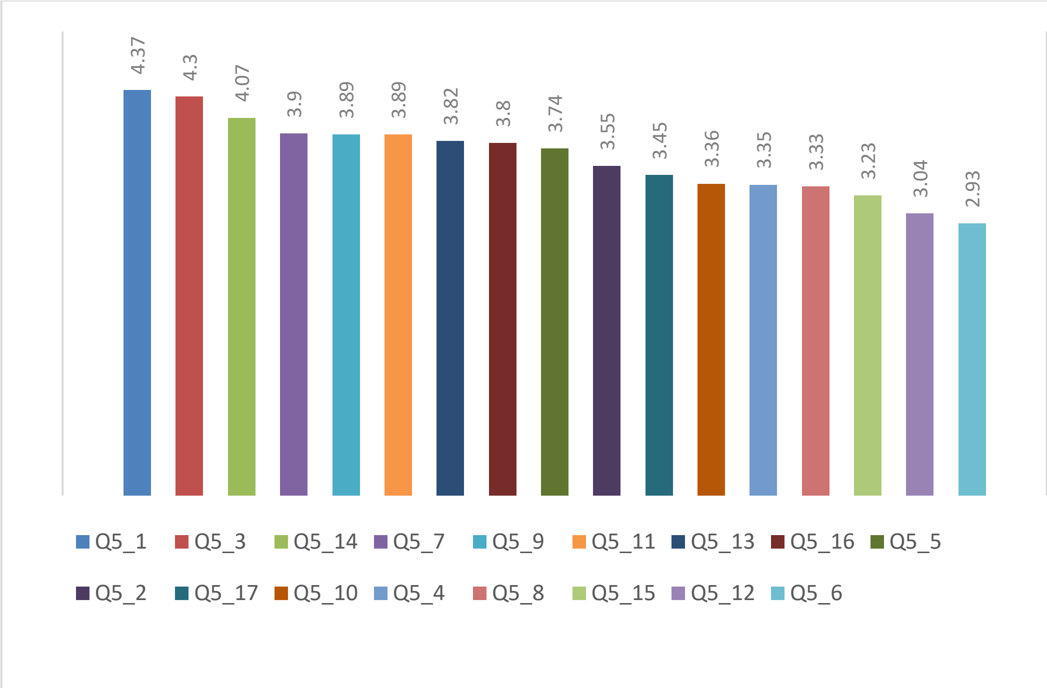


Figure 6-3 Most selected success factors

Source: Author

This chapter analysed barriers and success factors in walkability for POS in Tripoli city centre. This section clarified success factors that affect users to spend a long time in and to revisit POS. PCA was carried out on the 17 question variables of 'Please use the scale to indicate the following success factors that will affect spend time for walking and revisit the POS: (1) strongly disagree (2) disagree (3) neither agree nor disagree (4) agree (5) strongly agree'. Analysis of the 17 variables embodied the convergence of four factors in four iterations of rotation that account for more than 54% of the total variance. The KMO measure (0.837) verified the sampling adequacy for the analysis. The percentages of variance for these factors as shown in Table 6.24, the convergence of four components in four iterations of rotation that account for 55% of the whole variance. The percentages of variance for these factors are 26.204%, 14.695%, 7.671%, and 7.066% respectively. the first component refers to Aesthetic factors. While the second component present safety and security factors. Third component walking facilities factors. And the last referring to social interactions factors.

Table 6.24 Rotated component matrix for 'success factors' question

Rotated Component Matrix[a]				
	Component			
	1	2	3	4
Q4_6: Walkable public open space should be clear of trash	.820			
Q4_8: Walkable public open space should have high quality architecture	.813			
Q4_15: Walkable public open space should have historical significance	.787			
Q4_17: Periodic maintenance of buildings and streets POS	.723			
Q4_10: A public open space should have attractive views and elements, and soft landscaping such as green spaces and water elements	.529			
Q4_4: Prevent traffic in some streets in the city centre, customized for walking	.458			
Q4_9: More attention in safety and security		.769		
Q4_7: More visible police presence		.753		
Q4_16: A public open space should include well-connected elements and give sufficient pedestrian moving opportunities		.699		
Q4_11: Walkable public open space should have CCTV system		.676		
Q4_5: Walkable public open space should have facilities for crossing the streets and reduce traffic speed in the vicinity		.674		
Q4_1: Good links to other parts of the city by different types of public transport (e.g. taxi & bus)			.637	
Q4_12: Provide convenience & comfort facilities such as public toilet, shelter, car parking etc.			.581	
Q4_2: Improve accessibility to the public spaces and other land use types, such as shops, public library, etc.			.546	
Q4_13: Create more commercial activity, playground facilities, and create more mixed land use in/around the walkable POS			.493	
Q4_3: Walkable POS should have diversity of social activities for different age groups				.702
Q4_14: Walkable public open space should give people privacy by feeling boundaries between themselves and others				.616

Source: Author

Table 6.25 shows that four components were retained following parallel analysis, as their eigenvalues exceeded the corresponding data from the random sample, and the components explained approximately 55% of the variance. Figure 6-4 presents the actual eigenvalue from PCA and criterion value from a parallel analysis, whereby all factors are more than the criterion value from a parallel analysis, so they have been retained.

Table 6.25 Parallel analysis for 'the success factors that affect in users to spend time for walk and revisiting POS' correlates

Component No	Actual Eigenvalue from PCA	Criterion Value from Parallel Analysis1	Decision
1	4.45	1.43	Retain
2	2.49	1.33	Retain
3	1.30	1.27	Retain
4	1.22	1.22	Retain

Source: Author (The retain factor determined by using Watkins (2000) Monte Carlo software recommended by Pallant (2010))

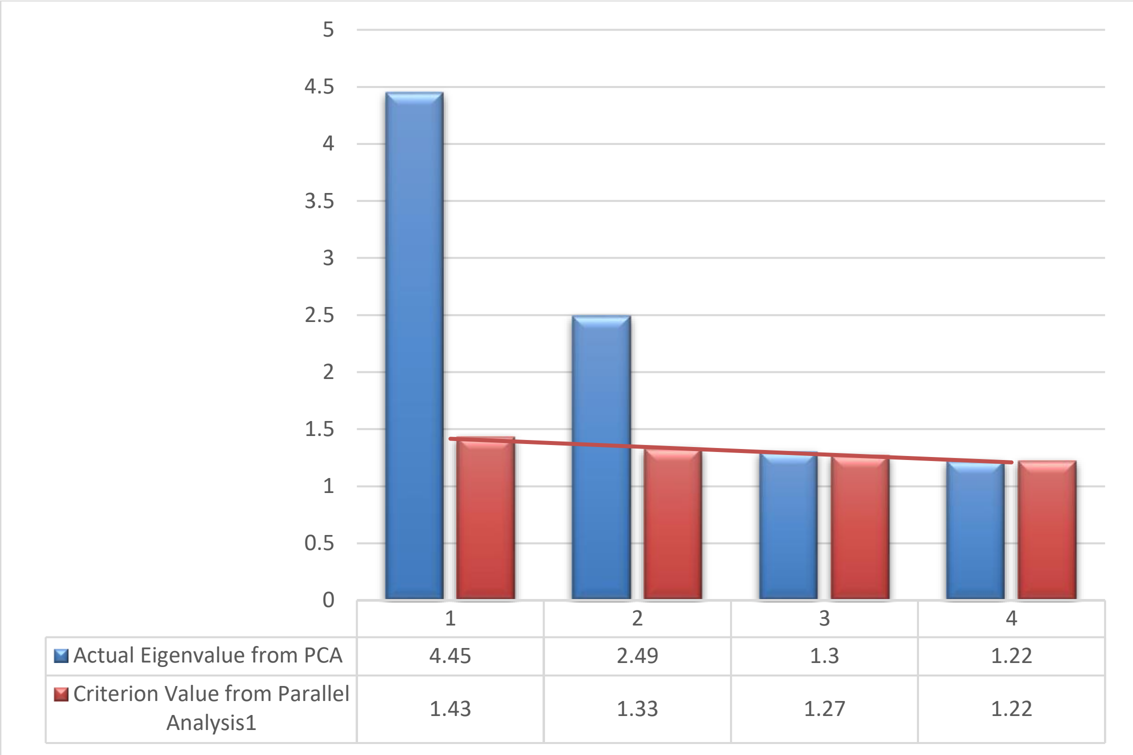


Figure 6-4 Actual eigenvalue from PCA and criterion value from parallel analysis

Source: Author

Table 6.26 presents the percentage variance for constructed component and their internal consistency scores for the generated scales. Aesthetic factors and safety and security factors all have alpha scores of over 0.750, which is ideal. On the other hand, walking infrastructure facilities factors and social interactions factors components have alpha scores below 0.7, and the number of items in this factor less than 10; the alpha scores for factors can be small so ICC should also be measured. The ICC scores for the sub-component are within the optimal range of 0.2 to 0.4 (Pallant, 2010). Considering this information, the four generated sub-components were deemed suitable by the researcher.

Table 6.26 Success factors' component properties

Component	# items	α	Variance Explained
Aesthetic factors	6	0.834	26.204
Safety and security factors	5	0.788	14.695
Walking facilities factors	4	0.487	7.671
Social interactions factors	2	0.401	6.337

Source: Author

The four components of the success walkability factors that make users walk and revisit POS in Tripoli presented in Table 6.26 were loaded with factors more than 0.4.

The first component (Aesthetic Factors, n = 6, α = .834) was constructed with the following items:

- Clear of trash.
- High quality in architecture.
- Historical significance.
- Periodic maintenance of the buildings.
- Attractive views and elements, and soft landscaping.
- Prevent traffic in some streets in the city centre, customized for walking.

The second component (Safety and Security Factors, n = 5, α = .788) was constructed with the following items:

- More attention to safety and security.
- More visible police presence.
- Well-connected elements and give sufficient pedestrian moving opportunities.
- CCTV system.
- Have facilities for crossing the streets and reduce traffic speed in the vicinity.

The third component (Walking Infrastructure Facilities Factors, n = 4 α = 487) was constructed with the following items:

- Good links to other parts of the city.
- Provide convenience & comfort.
- Improve accessibility.
- Create more commercial activity, playground facilities, and create more mixed land use in/around the walkable POS.

The fourth component (Social Interactions Factors, n = 2, α = 4) was constructed with the following items:

- Diversity of social activities for different age groups.
- Privacy.

6.1.11.1 Correlations between success components and POS walking duration

Table 6.27 shows that the aesthetic factors ($r = 0.765^{**}$, $p < 0.01$) and safety and security factors ($r = 0.722^{**}$, $p < 0.01$) have a strong relationship with the pos walking duration, while walking infrastructure facilities factors ($r = 0.41$, $p < 0.01$) and social interactions factors ($r = 0.212^{**}$, $p < 0.01$) have a weak relationship with the time spent walking in POS. Once again safety is the most important variable when people need to spend a long time in POS, due to the conflict in Libya.

Table 6.27 Correlations between the success components and POS walking duration

Correlations		
Spearman's rho		Maximum length of time spent walking in location
Aesthetic factors	Correlation coefficient	.765**
Safety and security factors	Correlation coefficient	.722**
Walking infrastructure facilities factors	Correlation coefficient	.412**
Social interactions factors	Correlation coefficient	.212**

**.Correlation is significant at the 0.01 level (2-tailed).

Source: Author

6.1.11.2 Correlations between success components and revisiting POS

Table 6.28 shows that aesthetic factors (r = 0.723**, p< 0.01) have a strong relationship with revisiting POS; safety and security factors (r = 0.442**, p< 0.01) have normal relationship with revisiting POS; and walking infrastructure facilities factors (r = 331**, p< 0.01) and social interactions factors (r = 0.212**, p< 0.01) have weak relationship with revisiting POS. This indicates that aesthetic factors and safety and security factors are highly instrumental in users revisiting POS.

Table 6.28 Correlations between success components and revisiting POS

Correlations		
Spearman's rho		How often do you visit this place?
Aesthetic factors	Correlation coefficient	.723**
Safety and security factors	Correlation coefficient	.442 **
Walking infrastructure facilities factors	Correlation coefficient	.352 **
Social interactions factors	Correlation coefficient	.212 **

**.Correlation is significant at the 0.01 level (2-tailed).

Source: Author

6.1.12 Discussion of the main results

A total of 427 participants were returned from all of the four case study areas, including 26% (n = 111) from AS (LW/GC), 25% (n = 109) from MS (HW/GC), 24% (n = 105) from RS (HW/PC), and 23% (n = 102) from OMS. The pilot study was conducted in October 2016. To assist the validation of outcomes from the main questionnaire survey, 15 face-to-face pilot questionnaire surveys were undertaken with Libyan students at Wolverhampton University, as well as the online questionnaire (Survey Monkey), which was then posted to Libyan students at the UK universities via Facebook pages. A total of 100 responses were returned. Respondents were requested to identify the reason for visit POS, the main barriers facing users to walking in POS in the city centre, and the users' needs to walk in POS. Most respondents agreed that the poor POS environmental conditions, safety and security, and poor public transportation were the main barriers in POS.

The first section of the users' survey assessed the effect of case study locations relative to participants' age, education level, and gender and time spent walking in and revisiting POS. In terms of the relationship between case studies and time spent walking, the results indicate that the case studies had a significant relationship with time spent walking, whereas the case studies had no significant correlation with the frequency of visitation, because people visit case study areas as part of daily activities such as going to work or shopping, while people choose where they can stay for a longer duration as part of their leisure considerations.

Participants' gender has a significant relationship with time spent for walking in case study areas, but no significant relationship with the frequency of visitation. This result differs from Abubrig's (2012) finding that the separation of genders has always been part of Libyan and Arab Islamic identity and traditions, including in use of public spaces. The age of the participants has a significant relationship with time spent walking in case study areas and frequency of visitation. Participants' education level has a significant relationship with time spent for walking in case study areas, but not with the frequency of visitation. The results of this section illustrated that socio-demographic characteristics are closely related to walking trips, which is consistent with the literature (Ewing & Cervero, 2010).

Analysis of barriers that prevented users spending a long time walking in and re-visiting the case study areas selected by approximately 60% of respondents in total included the high speed of traffic around POS, the high crime rate, the lack of facilities such as sports equipment, lack of disabled facilities, lack of physical facilities (such as sitting facilities for sitting, eating), the lack of linkages to the majority places around Tripoli, and the lack of public transportation available. PCA in this section showed that the main barrier affecting participants concerned facilities, safety, and aesthetic barriers.

Analysis of users' needs to spend time walking and revisiting the POS revealed that:

- 93% of respondents selected agree or strongly agree for more social activities.
- 92% selected agree or strongly agree for POS should facilitate people to watch people, fountains, public art, performances, etc.
- 79% selected agree or strongly agree for POS should have maximum land use
- 76% selected agree or strongly agree for no manifestation of carrying weapons and protection from offensive groups.
- 73% selected agree or strongly agree for the POS being free of vehicles.
- PCA of users' needs in the case study areas identified the need for physical elements, for safety and security, and for social interaction.

Analysis of success factors affecting in walkability in POS shows that the most important were improve public transportation (M = 4.37, agree 42.9% and strongly agree 48.0%), more social activities (M = 4.30, agree 33.7% and strongly agree 52.9%), privacy (M = 4.07, agree 47.8% and strongly agree 33.0%), more visible police presence (M = 3.90, agree 34.2% and strongly agree 35.1%) and more attention in safety and security (M = 3.89, agree 41.9% and strongly agree 31.1%).

PCA results for success factors in walkability in POS were aesthetic, safety and security, success walking infrastructure facilities, and successful social interactions factors.

Chapter 7

Phase Two: Professionals’ Perceptions of POS – Questionnaire Analysis (Evaluation of Current POS Design and Management)

The previous parts presented a set of descriptive statistics to portray the pattern of walkable POS demand and valuation in Tripoli by public survey. This part discusses the results of the social study of relevant professionals (mostly architects, urban planners, and landscape architects) in Tripoli, whose work involves them in various ways with the city’s planning and POS design. The rationale for this survey was to investigate the nature of walkability in Tripoli’s POS as understood by these professional workers, and to explore how they perceive its various functions and benefits, including Tripoli’s aspirations for its W-POS and their possible role in Tripoli’s goal to be seen and accepted as a ‘walkable city’. The survey also tried to gain insight into the general situation regarding the protection and loss of walkability in Tripoli’s POS, including the difficulties of preserving it in the light of pressures for its development, followed by asking respondents to evaluate a number of environmental and social criteria that might be considered in assessing the prospects of the case study areas for walkability.

7.1 Part Two: Professional questionnaire analysis

Table 7.1 shows the respondents’ fields of experience. It can be seen that 33% of them were in architecture, 21% in landscape architecture, 15% in civil engineering, 17% in urban planning, 10% in urban design, and 5% in public space management.

Table 7.1 Respondents' fields of experience

Field of Experience		Frequency	Percent
Valid	Architecture	36	33%
	Civil engineering	16	15%
	Landscape architecture	23	21%
	Urban planning	18	17%
	Urban design	10	9%
	Public space management	5	5%
	Total	108	100.0

Source: Author

Given the clear relevance of the professionals' backgrounds to POS, their views and evaluations can be assumed to be highly reliable, given their obvious professionalism. The respondents' years of experience in their fields are illustrated in Table 7.2, showing that the vast majority (93%) had more than five years' experience, which confers a large measure of reliability on the questionnaire results.

Table 7.2 Respondents' years of experience

The experience			
		Frequency	Percent
Valid	From 0-5 years	7	6.5%
	From 6-10 years	41	38.0%
	From 11-15 years	26	24.1%
	From 15-20 years	22	20.4%
	From 20-25 years	8	7.4%
	More than 25 years	4	3.7%
	Total	108	100.0

Source: Author

Table 7.3 shows the diversity of respondents according to their place of work; respondents came from five different institutions, all of which are clearly pertinent to to POS in Tripoli, suggesting the high reliability of the questionnaire data. 13.0% of the respondents worked in Tripoli University, 35.2% in Tripoli Municipality Planning, 22.2% in the Interests of Urban Planning, 16.7% in the Ministry of Housing and Utilities, and 13.0% in the private sector (architecture and design private companies).

Table 7.3 Respondents' workplaces

Place of Work		Frequency	Percent
Valid	Tripoli University	14	13.0%
	Tripoli Municipality Planning	38	35.2%
	Interests of Urban Planning	24	22.2%
	Ministry of Housing and Utilities	18	16.7%
	Private sector	14	13.0%
	Total	108	100.0%

Source: Author

qualifications shows the respondents' educational levels. 38.9% had a bachelor's degree, 33.3% an intermediate college diploma, 22.2% had a master's degree, and 5.6% had a PhD.

Table 7.4 Respondents' academic qualifications

Educational		Frequency	Percent
Valid	Intermediate college diploma	36	33.3%
	Bachelor degree	42	38.9%
	Master degree	24	22.2%
	PhD	6	5.6%
	Total	108	100.0%

Source: Author

Diversity in place of work, professional backgrounds, and levels of education helps ensure that the respondents had a relatively high level of comprehensive knowledge and expertise relevant to walkability and POS in Tripoli, and confirms that they represent quite well the range of professionals pertinent to a study of walkability and POS in Tripoli and Libya. Workers in the private sector were the least represented group in the sample, but given the limited size of the pool of individuals and organisations involved with POS in Tripoli, it can be conditionally concluded that a basis for capturing a broad range of views has probably been obtained through this set of responses. In a nutshell, this survey reached the desired target group of respondents.

7.1.1 Level of using walkable public space factors in Tripoli POS

Table 7.5 shows the results of section A3 of the questionnaire focused on respondents‟ views about factors of walkable POS and their functions in Tripoli. In Questions 6 to 11, the participants were asked 'using the scale 1-5 (5 = excellent, 1 = poor), could you point out how well you have done in carrying out walkable public space and what do you believe Tripoli is doing currently to implement its ideas and aspirations of being a "walkable city ?'

Table 7.5 shows the results of this section and the analyses of the professional group. Concerning question five, walkability in public space by accessibility, 45.5% of architects and 35.9% of civil engineers described accessibility in Tripoli's POS as poor, while 60.0% of those involved in Public Space Management answered fair, and 40% selected good. Clearly there is an implicit professional bias involved in the responses of those responsible for policy aspects of accessibility. Accessibility is one of the main distributive concerns in walkability and urban transport planning, and creating easy access to POS by way of walking for everyone is ubiquitously acknowledged as a government role, including ensuring the availability of facilities that can support the elderly and disabled to use public areas (Abdulla et al., 2016). The lack of accessibility to places where urban opportunities are located contributes to the lack of participation of some social groups in economic and social activities (SEU, 2003; Lucas, 2004; Lucas and Stanley, 2009).

Providing pedestrian facilities is a significant element of success of walkable cities. in question six the participants were asked about 'carrying out walkable public space by pedestrian facilities', and almost 55% agreed that using pedestrian facilities was very poor or poor. While 52% of the participants from the urban planning and urban design fields chose fair in question seven, the overall picture of poor pedestrian facilities in Tripoli is consistent with the results of question nine in the public survey.

Approximately 55% of professionals rating land use performance between poor to very poor; conversely, about 27% of the respondents evaluated their performance on land use to be between good and excellent. This is inconsistent with the users' answers in the public survey question 10, section A, B and C. This does not help make Tripoli a walkable city as mixed land use are supposed to be associated with a higher tendency for walking, because distances to destinations are shortened when various types of land uses are proximate to each other in the community. In addition, a short distance to the destination increases the probability that one will choose walking as the preferred mode of travel (Eoma and Chob, 2015).

In question eight the participants were asked about W-POS in Tripoli related to aesthetics. Approximately 53% of respondents rated their aesthetic place performance between poor to very poor, while nearly 25% of the respondents evaluated their performance on land use to be fair. In previous studies, walkability appeared to be more related to other environmental features, mainly aesthetics and the availability of recreation facilities and green spaces (Saelens and Handy, 2008), and this result has been confirmed by the previous public survey in this study in question 11, parts A, B, and C, where most of the public users were not satisfied with aesthetics in the four case study areas.

In this part of the questionnaire the participants were asked how much they are carrying out W-POS by safety and security design and management, and the answers varied by field. Approximately 46% of the architects rated their safety and security performance between good to excellent, while poor to very poor was selected by about 46% of civil engineers, 50% of landscape architects, and 60% of urban planners. Half (50.0%) of urban design respondents rated their safety and security performance as fair, while 60% of the POS management respondents rated their safety and security performance poor. This shows that Tripoli's POS was not walkable, confirming the analysis presented in the literature review section, and identification of the reliability of safety and security attributes of walking experience in public space areas is crucial in order to develop walkable environments (Karim and Azmi, 2012).

Question ten asked respondents ‘using the scale 1-5 (5 = excellent, 1 = poor), could you point out how well you have done in carrying out walkable public space by convenience & comfort, and what do you believe Tripoli is doing currently to implement its ideas and aspirations of being a “walkable city”?’

The answers to this section reflected variations in fields of experience. Approximately 44% of civil engineers, 43% of landscape architects, and 32% of architects rated their convenience & comfort performance between good to excellent. About 60.0% of public space managers, and 46% of the urban planning respondents rated their convenience & comfort as fair. Nearly 50% of the urban design respondents rated their convenience & comfort performance as poor.

Given that public space managers are the most directly responsible professionals for managing POS, the fact that the majority of them self-rate their performance as ‘fair’ and the great discrepancy between this view and other professionals, as well as the user survey responses (13A to 13G), indicates social desirability bias in the answers given, or a total lack of awareness of the egregious conditions of convenience & comfort in W-POS in Tripoli, with its extreme traffic congestion and limited spaces for pedestrian movement (Shamsuddin et al., 2004).

Table 7.5 Respondents' academic qualifications

Section A3	Architecture	Civil Engineering	Landscape Architecture	Urban Planning	Urban Design	Public space management
	N %	N %	N %	N %	N %	N %
Q6 Carrying out walkable public space by accessibility						
Very poor	4.5%	7.7%	8.7%	0.0%	0.0%	0.0%
Poor	45.5%	35.9%	47.8%	45.5%	37.5%	0.0%
fair	22.7%	30.8%	21.7%	27.3%	12.5%	60.0%
Good	22.7%	20.5%	21.7%	27.3%	50.0%	40.0%
Excellent	4.5%	5.1%	0.0%	0.0%	0.0%	0.0%
Q7 Carrying out walkable public space by pedestrian facilities						
Very poor	13.6%	10.3%	8.7%	9.1%	12.5%	20.0%
Poor	54.5%	41.0%	34.8%	27.3%	37.5%	40.0%
fair	9.1%	23.1%	30.4%	54.5%	50.0%	20.0%
Good	22.7%	25.6%	26.1%	0.0%	0.0%	20.0%
Excellent	0.0%	0.0%	0.0%	9.1%	0.0%	0.0%
Q8 Carrying out walkable public space by max land use						
Very poor	9.1%	10.3%	0.0%	18.2%	0.0%	0.0%
Poor	59.1%	17.9%	69.6%	27.3%	37.5%	60.0%
fair	13.6%	35.9%	13.0%	18.2%	12.5%	40.0%
Good	13.6%	35.9%	17.4%	36.4%	50.0%	0.0%
Excellent	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%

Source: Author

Table 7.5 Respondents' academic qualifications (cont.)

Section A3	Architecture	Civil Engineering	Landscape Architecture	Urban Planning	Urban Design	Public space management
	N %	N %	N %	N %	N %	N %
Q9 Carrying out walkable public space by aesthetic of the place						
Very poor	18.2%	10.3%	8.7%	9.1%	25.0%	0.0%
Poor	22.7%	53.8%	47.8%	36.4%	50.0%	80.0%
fair	36.4%	25.6%	26.1%	36.4%	25.0%	0.0%
Good	22.7%	10.3%	8.7%	18.2%	0.0%	20.0%
Excellent	0.0%	0.0%	8.7%	0.0%	0.0%	0.0%
Q10 Carrying out walkable public space by safety and security						
Very poor	4.5%	2.6%	4.5%	10.0%	0.0%	0.0%
Poor	31.8%	43.6%	45.5%	50.0%	37.5%	60.0%
fair	18.2%	15.4%	31.8%	10.0%	50.0%	20.0%
Good	36.4%	30.8%	18.2%	30.0%	0.0%	20.0%
Excellent	9.1%	7.7%	0.0%	0.0%	12.5%	0.0%
Q11 Carrying out walkable public space by convenience & comfort						
Very poor	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Poor	31.8%	35.9%	39.1%	36.4%	50.0%	40.0%
fair	36.4%	20.5%	17.4%	45.5%	25.0%	60.0%
Good	27.3%	41.0%	39.1%	18.2%	25.0%	0.0%
Excellent	4.5%	2.6%	4.3%	0.0%	0.0%	0.0%

Source: Author

Overall, Table 7.5 and Figures 6.5-6.10 show that approximately 45% of all participants selected very poor or poor for 'Carrying out walkable POS by accessibility', while about 52% of all participants showed very poor or poor for 'Carrying out walkable POS by pedestrian facilities'. Also, 49% of the participants chose very poor or poor for 'carrying out walkable POS by max and use', and 57% of all participants selected very poor or poor for 'carrying out walkable POS by aesthetics'. 44% of all participants chosen very poor or poor for 'Carrying out walkable POS by safety and security', and 37% of all participants selected very poor or poor for carrying out walkable public space by convenience & comfort.

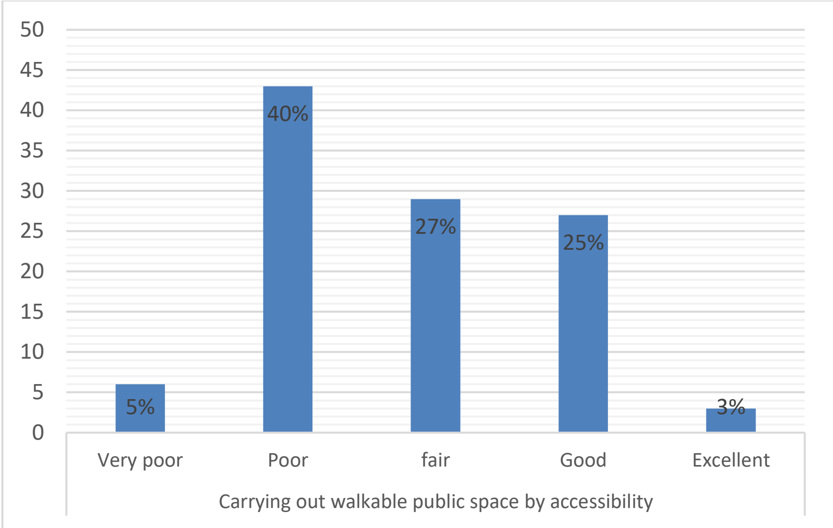


Figure 7-1 Use of W-POS dimension accessibility

Source: Author

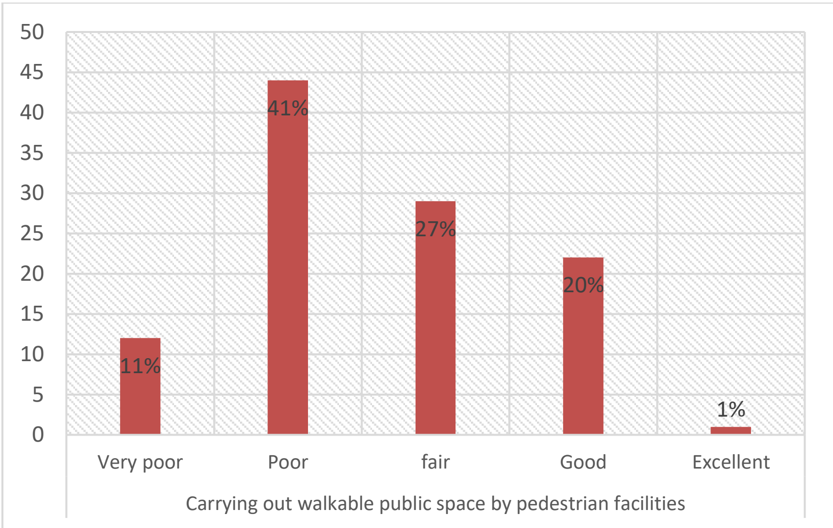


Figure 7-2 Use of W-POS dimension pedestrian facilities

Source: Author

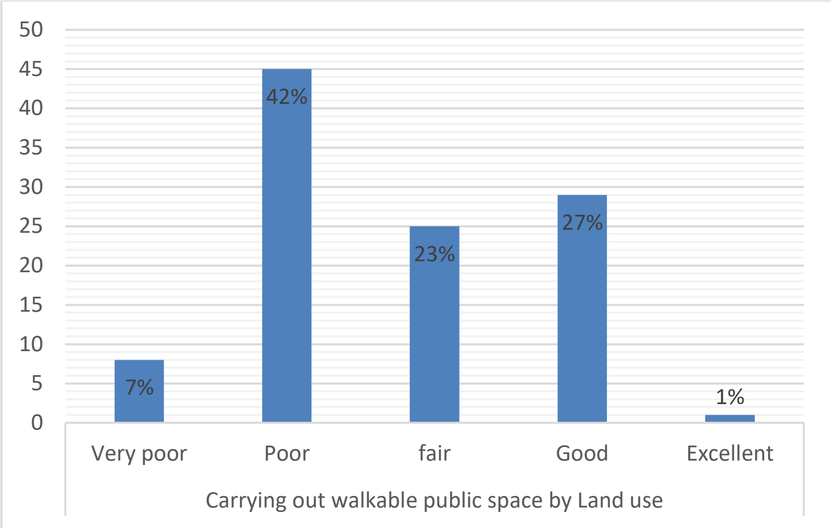


Figure 7-3 Use of W-POS dimension land use

Source: Author

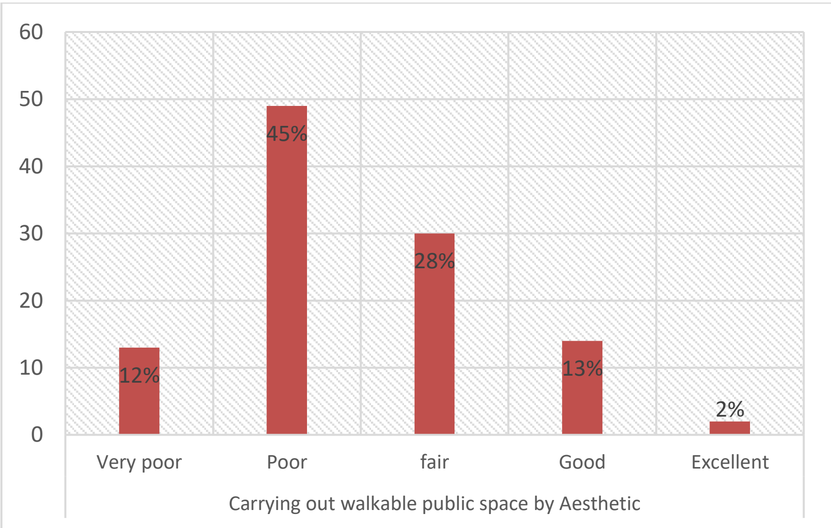


Figure 7-4 Use of W-POS dimension aesthetics

Source: Author

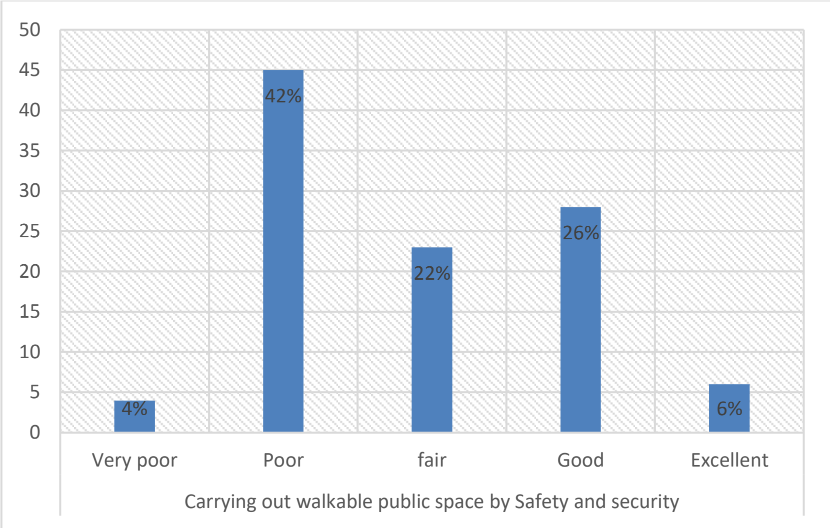


Figure 7-5 Use of W-POS dimension safety and security

Source: Author

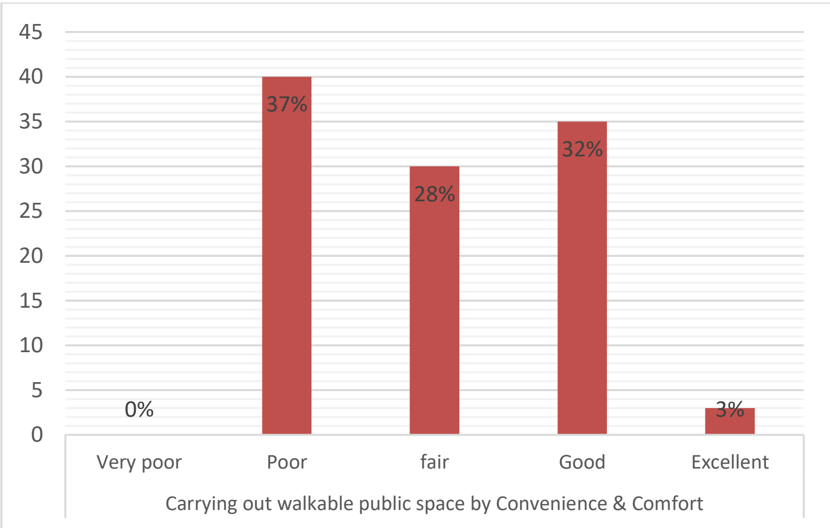


Figure 7-6 Use of W-POS dimension convenience & comfort

Source: Author

7.1.2 Tripoli as a walkable city

Alla and Hanafi (2014) illustrated that the issue which compounded the problem is weak management and poor supervisory system in the urbanisation of the city of Tripoli. In question eleven (Q11) the respondents were asked: 'have you even been asked your opinion regarding creating W-POS in your work?' Table 7.6 indicates that 38% of the respondents answered 'they have been asked once', and approximately 29% of the respondents answered 'they have never asked once', while approximately 21% the respondents answered 'they have been asked twice', and just 12% of the respondents answered 'they have been asked often'. These answers indicate important reasons for the lack of W-POS, given that experts in the design of public places are not consulted in the design and implementation of POS.

Table 7.6 Respondents' opinions

Have you even been asked your opinion regarding the creation of walkable public spaces in your workplace?		
Answer	Frequency	Percent
Never	31	29%
Once	41	38%
Twice	23	21%
Often	13	12%

Source: Author

Experts were asked about their experience to design and implement POS, as shown in Table 7.7. In question twelve (Q12) respondents were asked: 'Do you find your experience of your field where you work (such as architecture, retails, information, plazas, and walking spaces) is meaningful to you for design walkable POS?' Only 35% of respondents answered in the affirmative ('Yes' and 'Yes indeed'), with 41% of respondents answering 'No' and 'Not at all', while 24% answered 'Not sure'. This illustrates that all experts agree that the lack of professional consultation reflected on the design and poor implementation of W-POS.

Table 7.7 Use of professional experience

Answer	Frequency	Percent
Yes indeed	15	14%
Yes	23	21%
Not sure	26	24%
No	33	31%
Not at all	11	10%

Source: Author

7.1.3 Section B: Walkability policy and strategy

Section B of the questionnaire provided a platform for professions to discuss the barriers and success factors affecting walkability in Tripoli’s POS: (B1) aimed to determine the barriers affecting POS in Tripoli, and (B2) aimed to determine success factors in W-POS.

7.1.3.1 Barriers to creating successful walkable public spaces

This section started with question thirteen (Q13) ‘How would you index your level of satisfaction with services provided in walkability by a local authority?’ Table 7.8 shows that 59% of respondents answered ‘very poor’ and ‘poor’, while just 16% of the respondents responded ‘satisfactory’ and ‘very satisfactory’. This gives an indication that the Tripoli Municipality and the former and current Libyan governments do not consider POS and walkability factors in Tripoli city centre.

Table 7.8 Respondents’ level of satisfaction

	Frequency	Percent
Very poor	14	13%
Poor	50	46%
Not sure	26	24%
Satisfactory	15	14%
Very satisfactory	2	2%

Source: Author

Table 7.9 shows respondents’ rating of how listed barriers affect walkability in Tripoli’s POS, using a sliding scale of 1 to 5, where 1 implies a minor barrier and five a major one.

Table 7.9 Barriers affecting walkable public spaces in Tripoli

<table>
<tr><td colspan="5">Q14: Please use the scale to indicate how the following barriers affect practise walkability in Tripoli.</td></tr>
<tr><td>Not minor barrier</td><td>Minor barrier</td><td>I do not know</td><td>Barrier</td><td>Major barrier</td></tr>
<tr><td colspan="5">14-A: Public open spaces lack maintenance and development, making walking in the city centre very difficult</td></tr>
<tr><td>1% (1)</td><td>21% (23)</td><td>15% (16)</td><td>37% (40)</td><td>26% (28)</td></tr>
<tr><td colspan="5">14-B: Traffic volume and failure to enforce traffic regulations discourages walking in the city centre</td></tr>
<tr><td>2% (2)</td><td>29% (31)</td><td>26% (28)</td><td>33% (36)</td><td>10% (11)</td></tr>
<tr><td colspan="5">14-C: Lack of public transportation discourages people from walking in Tripoli city centre</td></tr>
<tr><td>2% (2)</td><td>14% (15)</td><td>16% (17)</td><td>39% (42)</td><td>29% (32)</td></tr>
<tr><td colspan="5">14-D: Public open spaces designers and managers are poorly trained</td></tr>
<tr><td>2% (2)</td><td>12% (13)</td><td>19% (21)</td><td>38% (41)</td><td>29% (31)</td></tr>
<tr><td colspan="5">14-E: There are no clear strategies or actions from local authorities encouraging walking</td></tr>
<tr><td>5% (5)</td><td>14% (15)</td><td>23% (25)</td><td>36% (39)</td><td>22% (24)</td></tr>
<tr><td colspan="5">14-F: Knowledge of the benefits of walking are low in Libyan society</td></tr>
<tr><td>1% (1)</td><td>27% (29)</td><td>30% (32)</td><td>33% (36)</td><td>9% (10)</td></tr>
<tr><td colspan="5">14-G: Limited funding makes the management and development of public open spaces very difficult</td></tr>
<tr><td>4% (4)</td><td>25% (27)</td><td>21% (23)</td><td>32% (35)</td><td>18% (19)</td></tr>
<tr><td colspan="5">14-H: Local authorities and institutions are weak for management and implementation of public open spaces in Tripoli to be walkable</td></tr>
<tr><td>2% (2)</td><td>11% (12)</td><td>21% (23)</td><td>35% (38)</td><td>31% (33)</td></tr>
<tr><td colspan="5">14-I: There is a lack of strategies to improve safety and security, such as controlling vehicle speed, improving pedestrian safety, lighting etc.</td></tr>
<tr><td>0.0% (0)</td><td>14% (15)</td><td>13% (14)</td><td>41% (44)</td><td>32% (35)</td></tr>
<tr><td colspan="5">14-J: Failure to implement and enforce traffic laws poses a risk to users of public open spaces</td></tr>
<tr><td>0.0% (0)</td><td>11% (12)</td><td>18% (19)</td><td>43% (47)</td><td>28% (30)</td></tr>
<tr><td colspan="5">14-K: Lack of landscaping and street furniture discourages walking in Tripoli city centre</td></tr>
<tr><td>1% (1)</td><td>6% (7)</td><td>21% (22)</td><td>38% (41)</td><td>34% (37)</td></tr>
</table>

Source: Author

These results led to the conclusion that POS in Tripoli have lack of walkable open space factors which should support walkability in Tripoli city centre. This reaffirms the findings of the users' survey. PCA was carried out on the 11 variables, the results of which are shown in Table 7.10, determining the barriers that play the most important to create an unsuccessful walkable POS.

PCA was used as an ordination method to produce more interpretable components (Field, 2009; Pallant, 2010). Analysis of 11 variables embodied the convergence of five factors in five iterations of rotation that account for more than 59% of the total variance. The KMO measure (0.621) verified the sampling adequacy for the analysis. The percentages of variation for these factors as shown in Table 6-33, which are 14.84% (Q14_E, Q14_H), 12.59% (Q14_I, Q14_J), 11.73% (Q14_B, Q14_C), 11.41% (Q14_A, Q14_G, Q14_K), and 9.20% (Q14_D, Q14_F).

Table 7.10 Rotated component matrix for 'barriers affecting walkable POS' question

Rotated Component Matrix [a]					
	Component				
	1	2	3	4	5
Q14_E: There are no clear strategies or actions from local authorities encouraging walking	.772				
Q14_H: Local authorities and institutions are weak for management and implementation of public open spaces in Tripoli to be walkable	.740				
Q14_I: There is a lack of strategies to improve safety and security, such as controlling vehicle speed, improving pedestrian safety, lighting etc.		.809			
Q14_J: Failure to implement and enforce traffic laws poses a risk to users of public open spaces		.524			
Q14_B: Traffic volume and failure to enforce traffic regulations discourages walking in the city centre			.744		
Q14_C: Lack of public transportation discourages people from walking in Tripoli city centre			.716		
Q14_A: Public open spaces lack maintenance and development, making walking in the city centre very difficult				-.726	
Q14_G: Limitation of funds makes the management and development of public open spaces very difficult				.631	
Q14_K: Lack of landscaping and street furniture discourages walking in Tripoli city centre				.523	
Q14_D: Public open spaces designers are poorly trained					.797
Q14_F: Knowledge of the benefits of walking are low in Libyan society					.404

Source: Author

Table 7.11 illustrates that in the following parallel analysis, five of five components were retained as their eigenvalues exceeded the corresponding data from the random sample. Figure 7-7 presents the actual eigenvalue from PCA and the criterion value from the parallel analysis, where factors 1, 2, 3, 4, and 5 are more than the criterion value from the parallel analysis, so they have been retained.

Table 7.11 Parallel analysis for 'barriers affecting walkable POS from the relevant professionals' perspectives correlates

Factor Component No	Actual Eigenvalue from PCA	Criterion Value from Parallel Analysis	Decision
Factor 1	1.632	1.546	Retain
Factor 2	1.385	1.382	Retain
Factor 3	1.290	1.262	Retain
Factor 4	1.255	1.1546	Retain
Factor 5	1.102	1.063	Retain

Source: Author (The retain factor determined by using Watkins (2000) Monte Carlo software recommended by Pallant (2010))

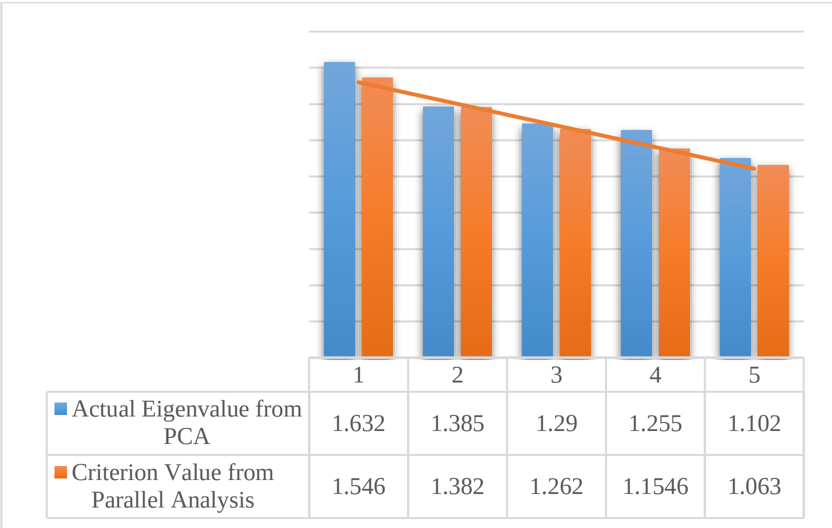


Figure 7-7 Actual eigenvalue from PCA and criterion value from parallel analysis

Source: Author

Table 7.12 presents the percentage variance for constructed component and their internal consistency scores for the generated scales. Lack of POS management and administration and lack of safety strategy alpha scores of over .6, which is good. On the other hand, lack of safety strategy, lack of transportation system, lack of aesthetics and lack of training and knowledge had alpha scores of 0.5, and the number of items in this factor less than ten in terms of alpha scores for factors can be small, so ICC should also be measured. The ICC scores for the sub-components are within the optimal range of 0.2 to 0.4 (Pallant, 2010).

Considering this information, the five generated sub-components were deemed suitable by the researcher. The five barriers presented in Table 7.12 are the items loaded with factors more than 0.4.

Table 7.12 Barriers affecting walkable POS from the relevant professionals' perception component properties

Component	# items	α	Variance Explained
Lack of management and administration	2	.6	14.842
Lack of safety and security strategy	2	.5	12.599
Lack of transportation system	2	.5	11.730
Lack of aesthetics	3	.3	11.414
Lack of training and knowledge	2	.3	9.206

Source: Author

The first component (Lack of POS management and administration, n = 7 α = .8) was constructed with the following items:

- There are no clear strategies or actions from local authorities encouraging walking.
- Local authorities and institutions are weak for management and implementation of POS in Tripoli to be walkable.

The second component (Lack of safety strategy, n = 5, α = .2) was constructed with the following items:

- There is a lack of strategies to improve safety and security, such as controlling vehicle speed, improving pedestrian safety, lighting etc.
- Failure to implement and enforce traffic laws poses a risk to users of POS.

The third component (Aesthetic elements barrier, n = 2, α = .5) was constructed with the following items:

- Traffic volume and failure to enforce traffic regulations discourage walking in the city centre.
- Lack of public transportation discourages people from walking in Tripoli city centre.

The fourth component (Lack of aesthetics, n = 3, α = .3) was constructed with the following items:

- POS lack maintenance and development, which makes walking in the city centre very difficult.
- Limited funds are made to manage and develop the POS very difficult.
- Lack of landscaping and street furniture discourages walking in Tripoli city centre.

The fifth component (Lack of aesthetics, n = 2, α = .3) was constructed with the following items:

- POS designers are poorly trained.
- Knowledge of the benefits of walking are low in Libyan society.

7.1.4 Evaluation of current POS design and management

This question aimed to determine the success of the current offerings of the local authorities in Tripoli in designing and managing POS as walkable spaces. Table 7.13 shows the results from question 15 from interdisciplinary perspectives. The majority of urban planners and landscape architects (64% and 56%, respectively) and half of architects selected poor practice for managing and designing POS, while 41% of architects selected good design and management for POS in Tripoli, which indicates that the POS in Tripoli is not bad in design and management. Approximately 44% of civil engineers selected excellent to good design.

Also, 50% of urban designers and 60% of public space managers selected good for design and management practice for POS.

Table 7.13 Respondents' level of satisfaction of designing and managing POS in Tripoli

Q15: How would you rate the effectiveness of current practice for managing and designing the public space to be walkable in Tripoli Municipality?						
	Architecture	Civil Engineering	Landscape Architecture	Urban Planning	Urban Design	Public space management
	N %	N %	N %	N %	N %	N %
Excellent	4.5%	5.1%	8.7%	18.2%	0.0%	20.0%
Good	40.9%	38.5%	34.8%	18.2%	50.0%	60.0%
Poor	50.0%	30.8%	52.2%	63.6%	12.5%	20.0%
Don't know	4.5%	25.6%	4.3%	0.0%	37.5%	0.0%

Source: Author

As shown in Figure 7-8, an important finding from this question is the implication that design and management for urban POS in Tripoli is uncoordinated and ad hoc, which affirms the discussion presented earlier in chapter six from the survey of public users. It must be agreed that the development in Tripoli city centre throughout the period observed had been spontaneous, un-controlled and haphazard. Tripoli has no effective master plans to guide its development, thus resulting in the preponderance of loose and unauthorised changes in land uses (Ali et al., 2008).

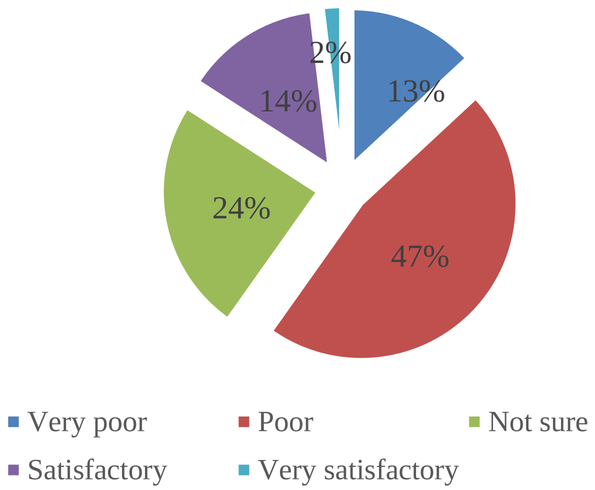


Figure 7-8 Evaluation of current POS design and management practice

Source: Author

7.1.5 Best equipped to manage and design POS to be walkable in Tripoli

The section aimed to determined who the preferable to manage and design the POS in Tripoli to be walkable. Figure 7-9 shows that 39% of the participants agreed that the best equipped parties to design and manage POS to promote walkability in Tripoli are joint public-private ventures, while 36% of the participants think private organizations would be preferable, and only 25% of participants selected government agencies.

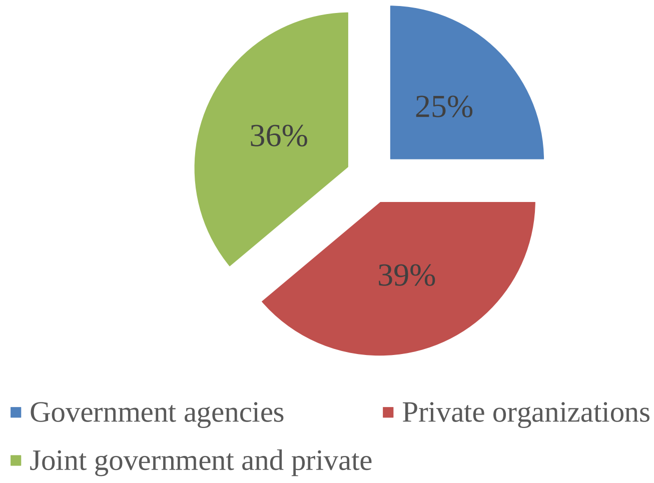


Figure 7-9 Best equipped stakeholders to manage and design POS

Source: Author

7.2 Ranking of success factors by order of importance

Table 7.14 lists the nine success factors affect in Tripoli's W-POS. Respondents were asked to use a scale of 1-5 (where a value of 1 implies minimal factors effect, while five implies that the strategy has a major effect) to categorise the listed success factors effect design and management of W-POS in Tripoli. These factors are listed below with corresponding respondent data and mean values.

Factor 1: 76% (mean: 4.01) selected 'more attention to safety and security', highlighting that the security and safety conditions in Libya nowadays affect all social classes. Aside from conflict, post-conflict, and developing country contexts, safety is one the most influential factors in attracting people to POS (Namin et al., 2013).

Factor 2: 74% (mean: 3.95) selected 'encourage urban planners, urban designers, and managers to intensive training', corroborating the findings of El-Allous (2016) on Libyan architects' lack of knowledge in urban design, urban planning, and walkability, which does not help to design and manage POS to be walkable in Tripoli.

Factor 3: 73% (mean: 3.94) selected 'create a centralized organization for design and planning POS'.

Factor 4: 77% (mean: 3.94) selected 'More attention of pedestrian facilities', consistent with the results of a previous public survey by Mohamed (2013), who observed that the city of Tripoli, and Libyan cities in general, face many difficulties in infrastructure due to 'common urban issues, such as poor infrastructure and low quality'.

Factor 5: 71% (mean: 3.92) selected 'Provide convenience & comfort facilities such as public toilet, sites, etc.', highlighting the dereliction of local authorities to perform their duties, and this came from a set of factors that will be discussed later. This result supports the conceptual definition of comfortability, as something about the feeling of physical relaxation and psychological satisfaction (Francis, 2009). Physical relaxation is due to the design of a place with proper physical setting and management strategies (Basak, 2011), and for more casual walkers, comfort reflects elements such as being close to smooth path surfaces, toilets, shops, and refreshments.

Factor 6: 61% (mean: 3.69) selected 'Prevent traffic in some streets in the city centre and customise it only walkability', which supports Tripoli City Centre's Urban and Architectural Charter (2010), which concluded that the Municipality of Tripoli proposed to renovate some of the problem streets in the city centre to make them walkable streets.

Factor 7: 45% (mean: 3.26) selected 'Create more mixed land use', suggesting that in general mixed land use is not one of the main problems for for W-POS.

Factor 8: 10% (mean: 3.13) selected 'More attention to aesthetics in the city centre public spaces', suggesting that in general aesthetics are not one of the main problems for W-POS.

Factor 9: 30% (mean: 2.98) selected 'Improve access to POS', suggesting that in general accessibility is not one of the main problems for W-POS.

Table 7.14 Success factors for Tripoli's POS to be walkable

Q17: Please use the scale to indicate how the following strategies will affect walkability in Tripoli's POS A value of 1 will imply factor minimal effect while 6 implies factor has major effect						
N	No effect	Minimal effect	I do not know	Effect	Major effect	Mean
1	Walkability strategy: more attention in safety and security					
	(1) 0.9%	(14) 13.0%	11) 10.2%	(39) 36.1%	(43) 39.8%	4.01
2	Walkability strategy: urban planners, urban designers, and managers should be encouraged intensive training					
	1 (0.9%)	14 (13.0%)	13 (12.0%)	41 (38.0%)	39 (36.1%)	3.95
3	Walkability strategy: creating a centralized organization for design and planning public open space					
	1 (0.9%)	11 (10.2%)	17 (15.7%)	43 (39.8%)	36 (33.3%)	3.94
4	Walkability strategy: more attention of pedestrian facilities					
	(0) 0.0%	(11) 10%	(13) 12%	(54) 50%	(29) 27%	3.94
5	Walkability strategy: - provide convenience & comfort facilities such as public toilet, sites, etc.					
	2 (2%)	15 (14%)	14 (13%)	36 (33%)	41 (38%)	3.92
6	Walkability strategy: prevent traffic in some streets in the city centre and customize it only walkability					
	2 (2%)	(17) 16%	(23) 21%	(36) 33%	(30) 28%	3.69
7	Walkability strategy: create more mixed land use					
	2 (1.9%)	33 (30.6%)	25 (23.1%)	31 (28.7%)	17 (15.7%)	3.26
8	Walkability strategy: more attention to aesthetics in the city centre public spaces					
	(33) 30.6%	(30) 27.8%	(31) 28.7%	(11)10.2%		3.13
9	Walkability strategy: improve accessibility to public open space					
	1% (1)	(39) 36%	(36) 33%	(25) 23%	(7) 7%	2.98

Source: Author

7.3 Summary

The result of the questionnaire (part 2) illustrated in this section provide insights about professionals' perception of walkability in Tripoli and their evaluation of the quality of the POS, in addition to their understanding of the design and management of POS to be walkable. However, existing POS in Tripoli were perceived by the professionals (108 participants from architecture, civil engineering, landscape architecture, urban planning, urban design, and public space management) as very poor or poor quality for walkability when they have been asked if they carrying out W-POS in Tripoli by using the six walkability factors (accessibility, pedestrian facilities, max land use, aesthetic, safety and security, and convenience & comfort), requiring development.

The majority (67%) of participants had 'never been asked or were asked once' about their opinion regarding creating a W-POS. When participants were asked about the major barriers to the development of W-POS in Tripoli:

- 63% cited lack of maintenance and lack of development.
- 68% selected lack of public transportation.
- 67% selected poor designer and manager training.
- 63% selected lack of management and implementation of POS in Tripoli to be walkable.
- 70% selected lack of strategies to improve safety and security in Tripoli, and lack of landscaping and street furniture, and lack of enforcing traffic laws are major barriers that prevent the creation of W-POS in Tripoli.

The PCA results in this section have shown that the main barriers preventing the creation of W-POS in Tripoli are:

- Lack of POS management and administration.
- Lack of safety strategy.
- Lack of transportation system.
- Lack of aesthetics.
- Lack of training and knowledge.

Approximately 45% of respondents selected poor practice design and management for urban POS in Tripoli Libya, and 39% considered private organisations would be the 'best equipped to manage and design the POS to be walkable in the city of Tripoli?', although 36% selected joint public-private projects.

In addition, the participants have been asked to 'please use the scale to indicate how the following strategies will affect walkability in Tripoli's POS'. More than 70% of the participants selected more attention to safety and security, urban planners, urban designers, and managers should be encouraging mass transit, creating a centralized organization for design and planning POS, and Provide convenience & comfort facilities such as public toilet, sites, etc. as major requirements in W-POS strategies for Tripoli. Around 60% of the participants selected 'Prevent traffic in some streets in the city centre and customise it only walkability' as a strategy effect or major effect.

Finally, 45% of participants selected 'create more mixed land use'; just 30% selected 'Improve access to POS'; and only 10% of participants thought that more attention was needed for aesthetics in the city centre POS.

Chapter 8

Phase 2: Assessing Walkability in Tripoli's POS – Observation Method

Tripoli has been rapidly growing, and its population has almost quadrupled in less than 20 years, from 0.5 million in 1993 to 1.5 million in 2013 (Alzklaa, 2016). It has significant assets, particularly its urban and architectural heritage, as well as in urban planning and urban design. However, as a capital city, Tripoli confronts essential challenges. It is facing a lack of maintenance of urban design, which has been disregarded by successive Libyan governments, as evident in poor maintenance of open spaces, pedestrian paths, and street furniture. Furthermore, the city of Tripoli is separated from the sea (a natural open space) by a high-speed coastal motorway, which makes the crossing the road to the coast more dangerous (Lakhder and Dugeny, 2010).

Moreover, the regulations of land use applied since the 1990s preclude overcoming most of these difficulties. Many open spaces and streets originally for pedestrians have been destroyed under these regulations (Lakhder and Dugeny, 2010). Besides, the crisis in Libya since 2011 has facilitated the rise of crime and the spread of illegal phenomena, including parking on pedestrian pathways and selling merchandise in the street. Additionally, the lack of clear pedestrian pathways from MS to OMS, and the mix between vehicle traffic and pedestrian movement, does not improve the comfort of aesthetic enjoyment of the central area (Alzklaa, 2016).

A review of the literature shows that most researches associated with walking are made in Western contexts (i.e. the US, Australia, and Europe), while in North African cities there are few studies considering the issue of walkability. This is significant as Arab-Islamic cities in MENA traditionally had careful urban design based around human, pedestrian comfort and sustainability, which could offer insights for sustainable modern solutions in the region

(Abdulla et al., 2016). The study of walkability in Libyan cities is an urban design field with the chance to consider the development of the city's design and management from a more comprehensive view. As illustrated in Chapter 4, observation tools were used in this research as a third tool in data collection during the fieldwork. The observation in this study was conducted in four areas in Tripoli. Each case study's boundaries are clearly defined by the surrounding streets or buildings, as shown in Figure 8-1 They include all walkable public spaces types, as described in section 4.2.5.

These sites were selected with the assistance of experts as described in phase one in this study. The observation involved spending 30 minutes at the four selected case studies at four different times of the day (morning, afternoon, evening, and night) twice each on weekdays and weekends, between 08:00 and 23:00. The data were collected from 15/04/2017 to 30-05/2017. The tools used in observation were the camera for taking photos, visual observations, behavioural map sheets, and pedestrian count recording sheets, as can be seen in Appendix 6.

1- Omar Mukhtar Street as low walkable open space with Poor environment condition (L.W./P.C),
2- Martyrs' Square as high walkable open space with good environment condition (H.W/G.C),
3- Algeria Square as low walkable open space with poor environment condition (L.W/G.C),
4- Al-Rasheed Street as high walkable open space with poor environment condition (H.W/P.C).

Figure 8-1 Four public open spaces used as case study areas

Source: Author

8.1 Omar Al-Mokhtar Street (OMS) as low walkable open space with poor environment condition (LW/PC)

OMS is located within Tripoli on the coastline of the northern side of the city centre, and it is one of the main thoroughfares in the city. Radiating from the city centre (MS), OMS is approximately 3 km long and about 10 m wide. As Alzklaa (2016) noted, the solid spaces in OMS are distributed regularly, giving a geometric shape around the central axis of the street, with green space, and parking in the middle and open space within which the Tripoli International fair is held, a flagship cultural event. Buildings along OMS have diverse uses, including commercial, residential, religious, administrative, educational, health, and cultural. There are many apartment buildings and no independent commercial buildings (Figure 8-2). OMS is an iconic area in the history of Tripoli that reflects the Italian Fascist style of urban planning, between the traditional Ottoman landmarks of Al-Saraya Al-Hamra and Martyrs Square (Samur, 2013) Additionally, OMS is one of the most significant streets in Tripoli, and contains various activities that can potentially attract people to walk.

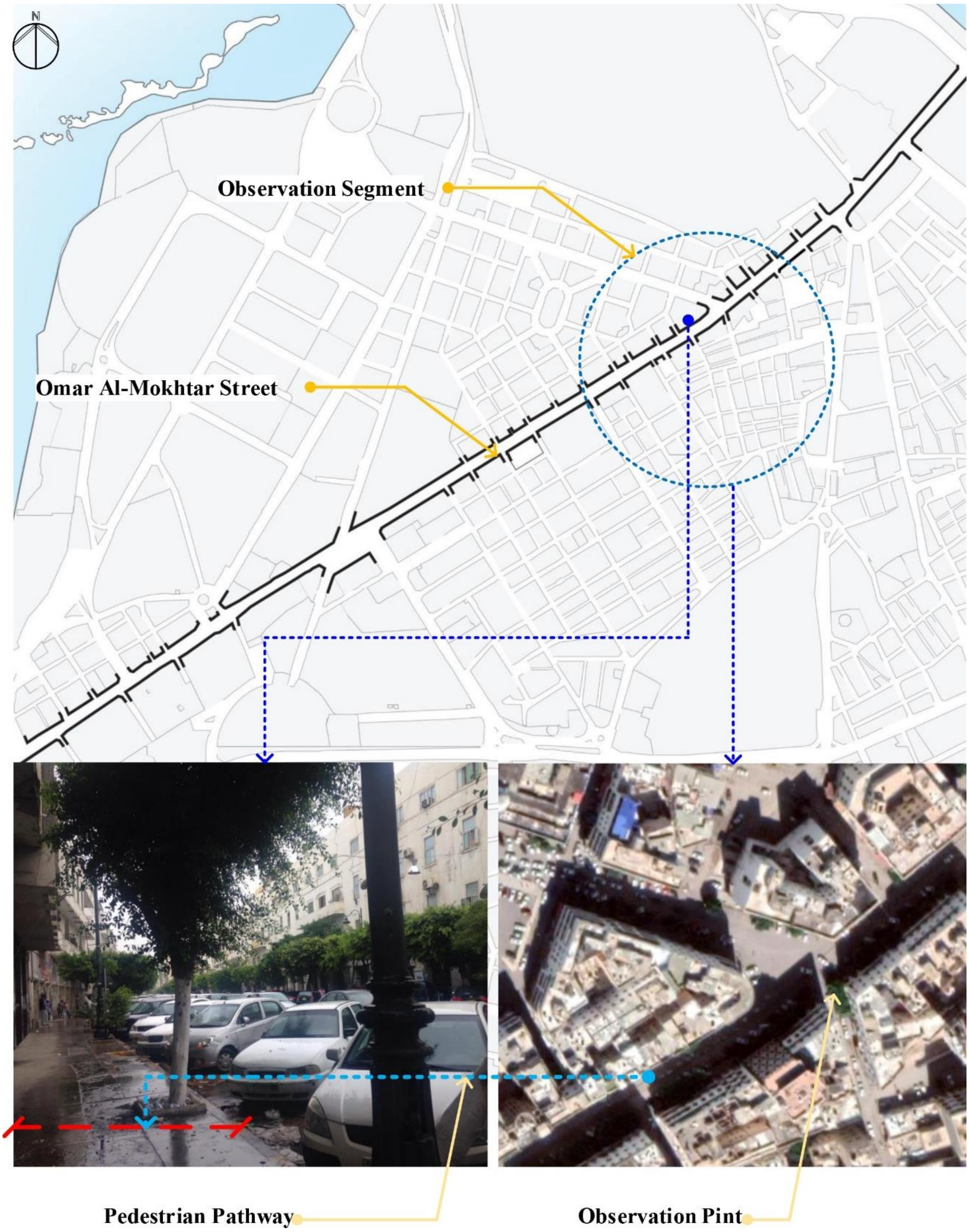


Figure 8-2 OMS as low walkable open space with poor environment condition (LW/PC)

Source: Author

8.1.1 Omar Al-Mokhtar Street weekend

To explore the pattern of uses in OMS groups and individuals, it is essential to understand who is using the space, when they use it, and how. Observations of OMS occurred over four sessions, as explained previously. Table 8.1 and Table 8.2 illustrates that the highest number of users was at weekends, in the evening from 18:00 to 18:30 (n = 448, 49% of users). Also, the study indicates that males represented 86% of users on the weekend, although 7% was the lowest number of the users observed, during the morning time. Only 7% of pedestrians were under-18s, and just 2% of users were more than 65 years old (elderly people). Concerning behaviour, walking was the major action recorded in OMS for both genders with 98%, with only 2% of users sitting. This reflects the lack of seating places mentioned previously and discussed later. During the observation time no other street activity was recorded.

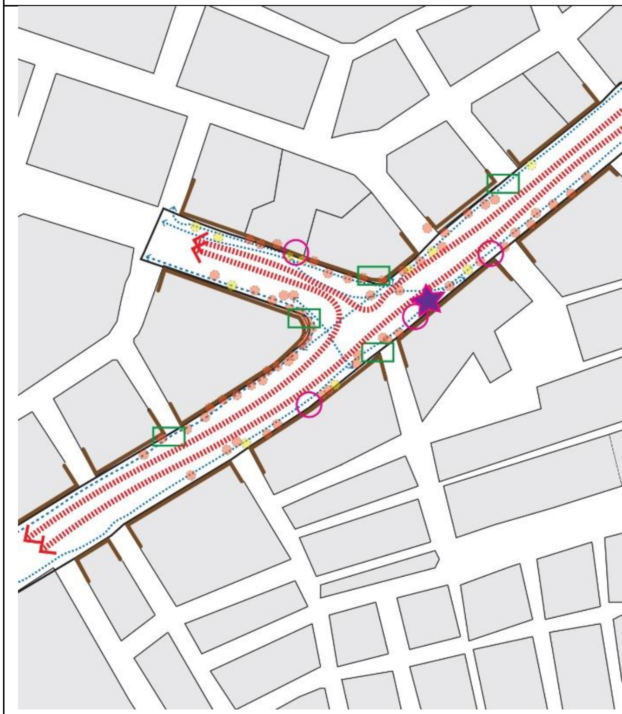
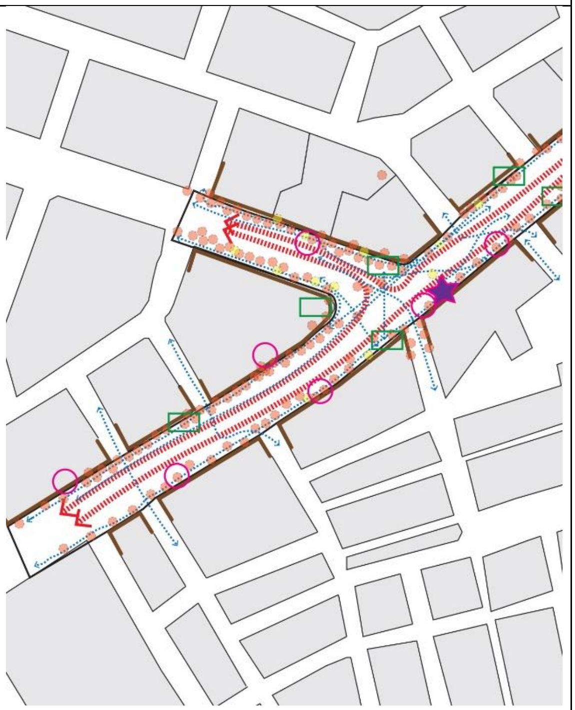
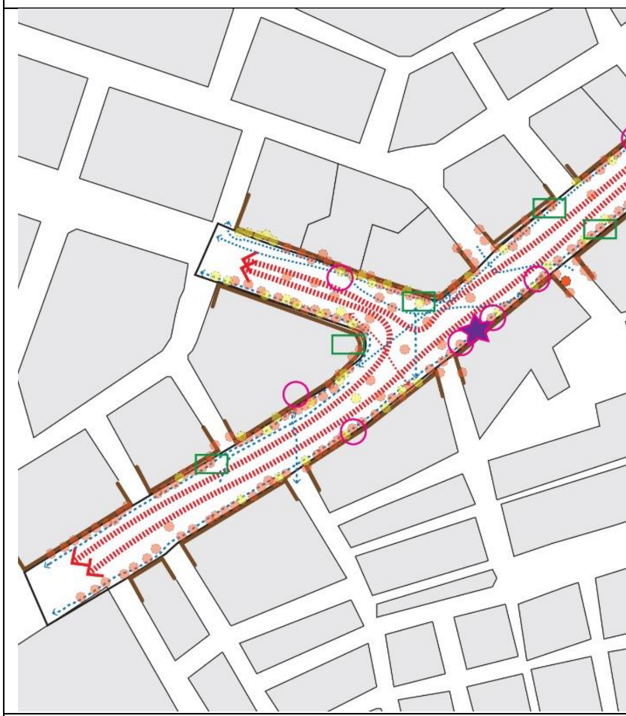
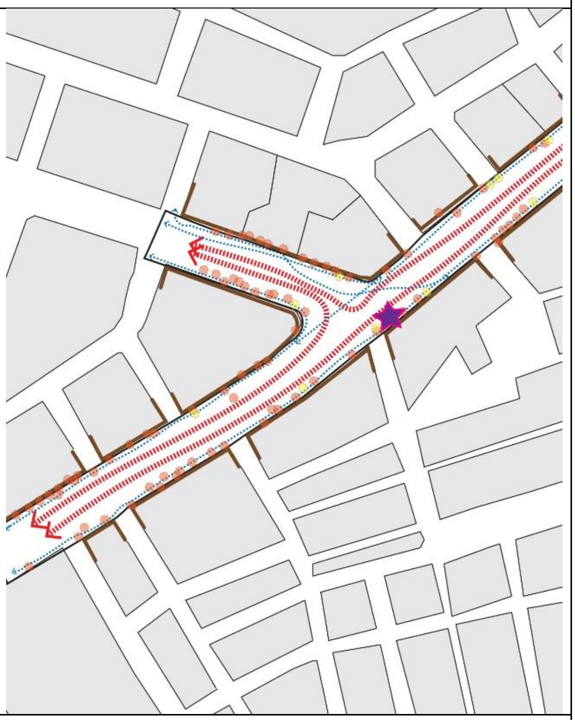
The second highest activity recorded during the 18:00 to 18:30 session was shopping, for 29% of pedestrians (recorded for anyone entering or leaving shops located on OMS). On the other hand, 17% of pedestrians do not use the crosswalk for crossing the street, choosing to brave the direct crossing of OMS. The observation found that most of the users visit the street using their cars, taxis, or private drivers, reflecting that Tripoli has no public transport system (Lakhder and Dugeny, 2010). OMS is considered as one of Tripoli's busiest streets in traffic. The study recorded 1,123 motor vehicles travelling in OMS. The highest number of the motor vehicles was recorded during the 18:00 to 18:30 session.

Table 8.1 The observation in Omar Al-Mokhtar Street, weekend

Omar Al-Mokhtar Street (LW/PC), Friday, weekend								
Observation elements	Time of observation							
	From	To	From	To	From	To	From	To
	8:00	8:30	14.00	14:30	18:00	18:30	23:00	23:30
Temperature	29°C		35°C		33°C		30°C	
Number of people	70		240		448		152	
Male	58		230		358		137	
Female	12		10		90		15	
Elderly (65+)	-		12		12		-	
People walking with children	-		-		24		6	
Under-18s	-		-		42		30	
People with prams	-		-		-		-	
People with wheelchairs	-		-		-		-	
Number using crosswalk	-		-		-		-	
Walk	69		231		441		157	
Sit	1		9		7		1	
Stand	-		-		-		-	
Run	-		-		-		-	
Number not using crosswalk for street crossing	30		66		66		-	
Number of vehicles	132		355		360		276	
Number of shoppers	4		-		158		-	

Source: Author

Table 8.2 Four Seasons observation in Omar Al-Mokhtar Street, weekend

Omar Al-Mokhtar Street Weekend Seasons	
	
Season 1	**Season 2**
	
Season 3	**Season 4**
Walking	Standing Area
Traffic way	Sitting Area
Male Users	Observation Point
Female Users	

Source: Author

8.1.2 Omar Al-Mokhtar Street weekday

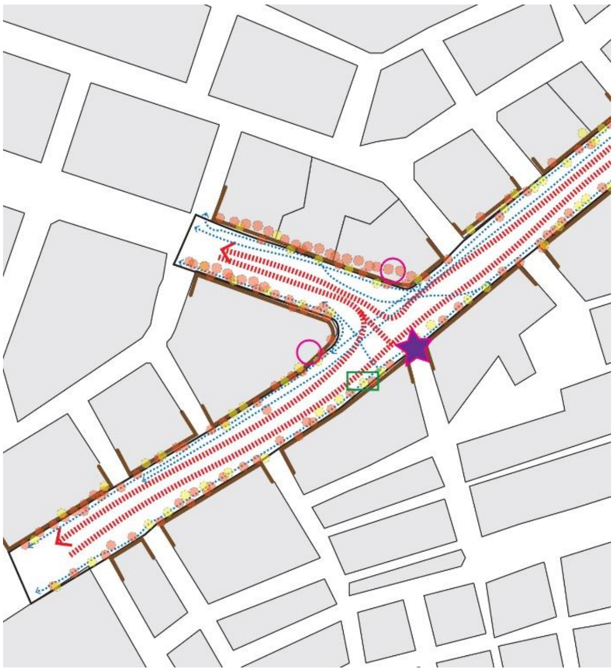
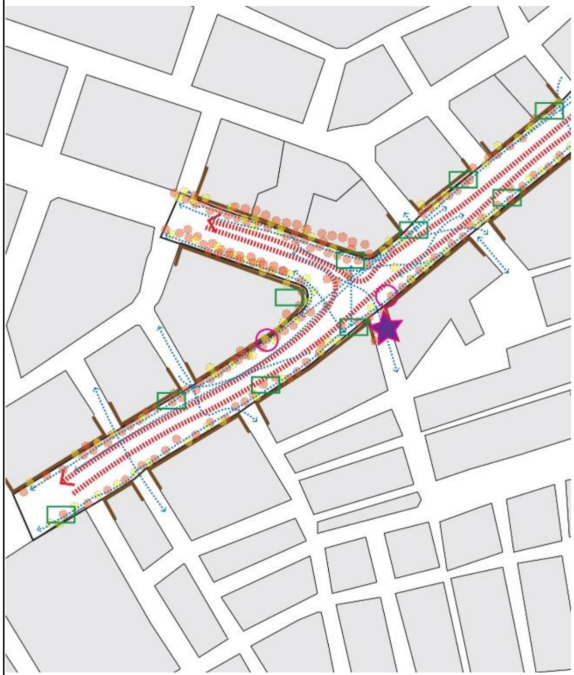
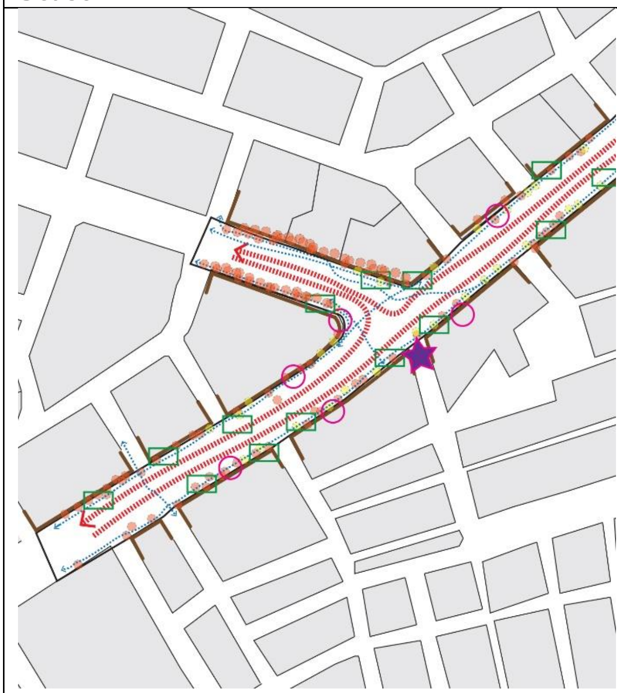
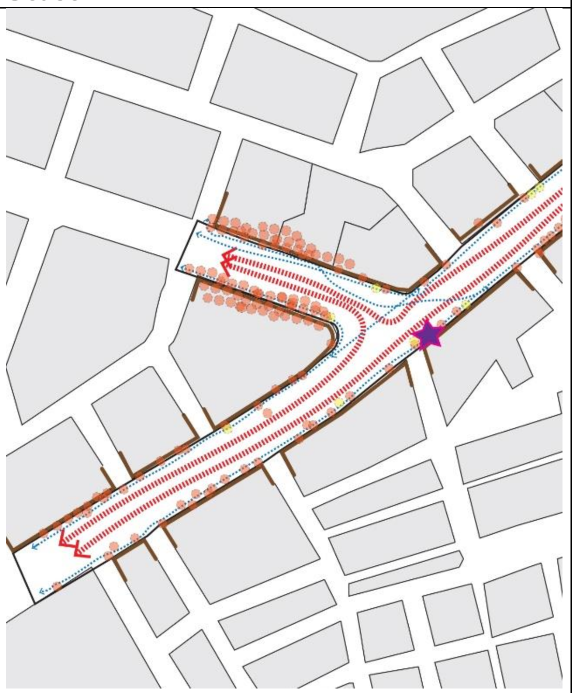
According to the weekday observation, as shown in Table 8.3 and Table 8.4, a total of 1,163 people used OMS during the observation time,51% of whom were male and 49% of whom were female reflecting the fact that most women using OMS are employees in section (the number of female users was high at 8:00 to 8:30 and 14:00-14:30 compared to other times of observation, which is the daily work time in Libya). During the weekdays (working days), the overall amount of walking trips was estimated to be higher than during the weekend. The weather was sunny and bright, and the temperature was approximately 29-30ºC. The observation shows that the highest number (38%) of users was recorded in the second session, from 14:00 to 14:30. This was expected for two reasons: first, due to the existence of restaurants in OMS, as this is lunchtime in Libya (slightly later than the European norm, when the intense midday heat begins to abate); and second, because this is the end of office hours' time. In the same way, the highest number of the motor vehicles was recorded during the 14:00 to 14:30 session. Walking (88%) was the main activity compared to sitting, standing, and others. In weekdays there was increased numbers of elderly people and under-18s compared to the weekend. There was less interaction in the evening time in OMS. However, because of the long distance from the start to end point in this street, there are still some problems for people who walk through the entire street. Those problems have been discussed continually in later paragraph.

Table 8.3 Observation in Omar Al-Mokhtar Street, weekday

Omar Al-Mokhtar Street (LW/PC), Monday, weekday								
Observation elements	Time of observation							
	From	To	From	To	From	To	From	To
	8:00	8:30	14:00	14:30	18:00	18:30	23:00	23:30
Temperature	29°C		35°C		33°C		30°C	
Number of people	221		750		98		94	
Male	111		351		64		60	
Female	110		399		34		34	
Elderly (65+)	10		12		8		9	
People walking with children	-		20		15		17	
Under-18s	7		24		9		11	
People with prams	-		6		13		9	
People with wheelchairs	-		-		-		-	
Number using crosswalk	-		-		-		-	
Walk	209		701		50		64	
Sit	4		2		11		12	
Stand	6		47		49		20	
Run	2		-		-		-	
Number not using crosswalk for street crossing	32		114		-		-	
Number of vehicles	621		510		234		234	
Number of shoppers	-		120		-		-	

Source: Author

Table 8.4 Observation in Omar Al-Mokhtar Street, weekday

Omar Al-Mokhtar Street Weekday Seasons	
	
Season 1	**Season 2**
	
Season 3	**Season 4**
Walking	Standing Area
Traffic way	Sitting Area
Male Users	Observation Point
Female Users	

Source: Author

8.1.3 Accessibility

All transport modes, including cars, are intended to promote accessibility, and from the mid-20th century cities were built to facilitate automobile access. However, such approaches failed to facilitate access for other users and were counterproductive to urban development goals (e.g. healthy populations and walkable cities). Accessibility must be understood in the broader context of being accessible to various users, including pedestrians of all ages and mobility levels, which is the primary concern in this study.

To evaluate OMS street quality regarding accessibility, four elements were assessed: connectivity, availability of public transportation, the number of footpaths, and number of significant barriers. Connectivity is a factor for street network patterns design in determines how pedestrians adapt street environments, and the level of accessibility that makes the space usable (Beavon et al., 1994).

A review of the current road network around OMS shows that the average width of the main road (the main routes of the city) are 16-18 meters, the connecting roads are 10-11 meters, and track roads are 6 meters in width. This road network in most of the area dates to the Italian occupation, and the road network around OMS has not been developed to accommodate increased numbers of street users and traffic congestion; it is unable to meet the traffic requirements around OMS currently, which causes severe traffic jams, and almost precludes pedestrian movement, traffic-flow, and access to service facilities.

Figure 8-3 indicates that the OMS has no appropriate public transportation system except for an old private bus, which accesses only a few streets. Public services related to public transport such as bus services, stations and stops are not available in OMS. The extent of the potential conflict between cars and pedestrians in adjoining streets is probably greater in OMS where two districts of south and north of Tripoli are separated by a OMS and retailed mixed-use area with poor environment, and without any public transportation around there, unless by walk or private car to access.

Figure 8-3 Public transportation in Tripoli

Source: Author

As discussed in Chapter 1, the number of vehicles in Libya has been continuing to increase rapidly for decades, and 76% of vehicles are private cars (Al-Fenadi, 2010). The vehicular lane of most streets connected to OMS are for one-way traffic. Figure 8-4 shows that the high volume of vehicular particularly during the daytime and holidays has triggered traffic congestion around OMS. The traffic congestion is also aggravated by the use of car lanes for parking.

Figure 8-4 Roads around OMS

Source: Author

There is a variety of pavement s along OMS, as shown in Figure 8-5, including covered pavements in front of the shops (six-foot way arcade) at both sides of the street, a wall on the north side, and non-covered pavement for the rest of the street. Overall, from the observation method, the number of pedestrians along OMS remained low compared to the other case studies, due to a combination of elements, including that the pavement gets narrow at some points of the street due to the lack of building law enforcement.

Figure 8-5 Pathway system in OMS

Source: Author

On the other hand, no wheelchair users were observed within the OMS observation. As can be seen in Figure 8-5 (a), verges provide an indicator of the present lack of accessibility of OMS pavements and verges for those with various ambulatory disabilities. Moreover, Figure 7.7 (b) shows that along segments of the street with no crossing lines, risk-averse pedestrians opt to use the street. Significant barriers in OMS include scaffolds used in buildings conservation. In addition, the lack of public transportation, traffic congestion along the street, and the presence of on-street parking along the pavement have decreased the walkability quality of the street.

8.1.4 Pedestrian facilities

Roads and pavements are in bad condition, and public space furniture is non-existent or heavily damaged (Abdulla et al., 2016). When POS has poor pedestrian facilities, only strictly necessary activities occur (Gehl, 1987). Observation illustrated that OMS has wide and latently positive conditions for pedestrian walkways on both sides of the road, but there is a total lack of pedestrian facilities, which prevents people from moving comfortably, as can be seen from crowds at intersections with MS and RS (Figure 8-6).

As Gehl (2010, p.97) stated, "many secondary seating options are often needed, places where people can more informally and spontaneously sit to rest or look around". The lack of basic infrastructures such as crosswalks, disabled facilities, street lighting, street furniture, and quality amenities was clearly observed at OMS. These problems with the built environment keep people from walking (National Household Travel Survey, 2009). A lack of pedestrian facilities affects people working or living in OMS, and visitors to the street. In addition, some parts of the pavement do not have walking paths, and even if they have there are street vendors occupying them. Tripoli city centre lacks disabled facilities, such as: facilitating access and provision, car parking for disabled people, and places to sit etc. Moreover, OMS has high-speed traffic, which also contributes to low walkability. In addition, the size of the street seem to be a key problem as the size is larger than the space utilised by people. That prevents walking comfortably.

Figure 8-6 Attraction point barriers to pedestrian pathways

Source: Author

8.1.5 Mixed land use

Abdulla et al. (2016) illustrated that the regulations of land use applied since the 1990s preclude overcoming most of the walkability problem in Tripoli. Many open spaces and streets which were for the pedestrians have been destroyed under these regulations (Lakhder and Dugeny, 2010). Cortright (2009) explained that places that are conducive to walking frequently have a host of other related characteristics as more of a mix of different land uses. Moudon et al. (2007) also found that mixed land use is strongly associated with walking. The solid spaces in OMS are distributed regularly, giving a geometric shape around the central axis of the street, with green space, and parking in the middle and open space within which the Tripoli International Fair is held, a flagship cultural event. Buildings along OMS have diverse uses, including commercial, residential, religious, administrative, educational, health and cultural. There are many apartment buildings and no independent commercial buildings (Figure 8-7).

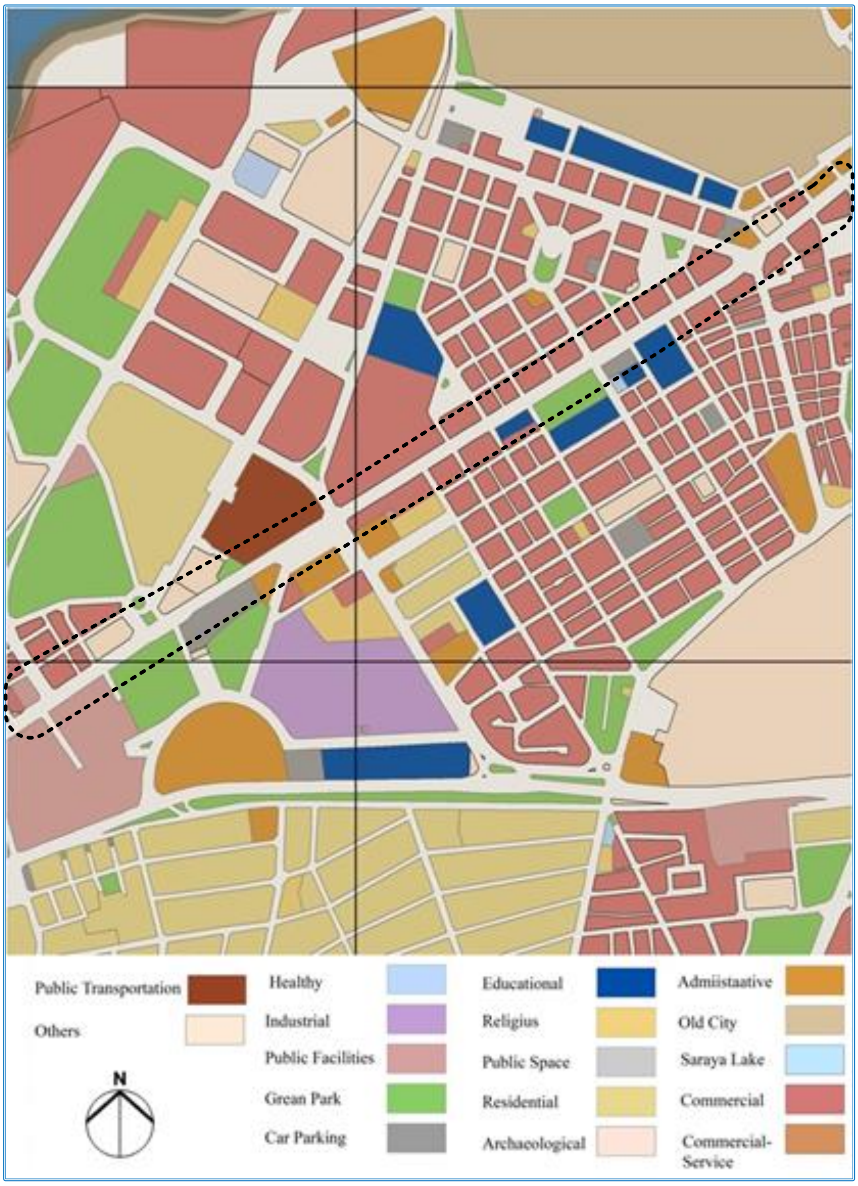


Figure 8-7 Land use around OMS

Source: Author

8.1.6 Place aesthetics

As explanted in privies chapters, aesthetic appreciation relates to the beauty (or ugliness) of a place (Woolley, 2003). The aesthetic elements of POS, such as the general maintenance, air quality, and presence of trees, favour walking for pedestrians (Kahana et al., 2003). As explained previously, its historicity, cultural heritage, and variety of activities underscore the particular importance of OMS as one of the most critical locations in Tripoli. The observation of OMS shows that it has a good quality of building facades with the variety of visual richness, such as architectural style, details, human activities, and green space. On the other hand, it lacks rudimentary street furniture and street landscape features. Rubbish bins are left randomly in the streets and on pavements, and there is poor maintenance and low quality infrastructure.

8.1.7 Safety and security

Safety and security have been of critical importance in Libya since 2011. Direct observation of safety in OMS confirmed that people do not prefer staying in OMS after 20:00, with a clear absence of police in the Street. There is a lack of pedestrian corridors from and to OMS, except through the main junctions, which are not simple for pedestrians to use, and which are made still less desirable by traffic intersection, and there are no traffic signs. In addition, pedestrians in many parts of Tripoli in general and in OMS particular are usually forced to walk on the roads and alongside cars, not just because of the poor quality of the pavements, but often because of the occupancy of pavements by shops and vendors. In addition, the observation noted a lack of lighting at night in OMS, due to power outages for long hours or the lack of regular maintenance of lamps in OMS, which gives users a sense of insecurity.

8.1.8 Convenience & comfort

The overall evidence shows that OMS used to have a strong image as a luxurious shopping street in the city of Tripoli. However, nowadays this image is fading, due to a lack of street facilities. Pedestrians should be able to comfortably walk the streets, with facilities such as shelters and public toilet, as well as public benches facilities (Abdulla et al., 2016). There is a general lack of services and facilities at OMS. Observation of OMS indicates that there are no trees along the street, with the exception of some pavement trees. Also, the observation shows that there is no consideration given for rubbish bins within the along the street, and most of the containers are located in streets and some cases they block pavements, forcing pedestrians to walk on the road. The lack of shelter, sitting places, and street furniture in OMS may also result in less comfortable walks, especially in inclement weather.

The observation of OMS illustrated another issue which hampers opportunities for walking comfortably, which is the absence of public toilets in OMS, expect in mosques, which are open only at prayer times, or restaurant toilets, which are reserved for customers only. Traffic problems in Tripoli are due to the only way of getting into the city centre being the use of personal cars or taxis, which causes traffic jams due to the lack of parking provision in the shopping districts around OMS. It has been observed that users informally park their motor vehicles in the first and the second lanes of the street.

8.2 Martyrs' Square (MS) as high walkable open space with good environment condition (HW/GC)

MS is a POS located in the centre of Tripoli (Figure 8-8). Founded in the 20th century in the time of Italian colonialism as 'Piazza Italia', after the independence of Libya in 1951 its name was changed to Independence Square, then to Martyrs' Square, and then to Green Square under the Gaddafi's regime, and nowadays it has reverted to Martyrs' Square. MS is located within the city of Tripoli on the coastline of the northern side of the city. The square is the centre of the city, bordered by the Al-Saray Al-Hamra and the seaport columns and the old city in the north, 'one of the monuments of Tripoli'. Some main streets branch out from it, such as OMS, Mezzran Street, and 24 December Street (Zaqlai, 2016). The square has served as a central stage for key political events, from the Italian occupation to Libyan independence, and throughout the rule of Gaddafi to the violent conflicts in post-Gaddafi Libya. Both pro- as well as anti-government actors have tried to use the square as a stage during these different periods.

Figure 8-8 MS as high walkable open space with good environment condition

Source: Author

8.2.1 Martyrs' Square weekend

Observation points were selected strategically to achieve as much visual coverage as possible. This section explores the users in MS by gender, activities, type of users, time of use, and way of use. The MS observations occurred over four sessions, as explained previously. As shown in Table 8.5 and Table 8.6, approximately 1054 people were recorded engaging in various activities within four time measurements at the weekend, using the walk-by pedestrian count technique. The study indicates that males represented 81% of users at the weekend, and the highest number of users at weekends was 36%, recorded in the evening time, while the lowest number of users was 16%, recorded in the morning. Only 9% of pedestrians were under-18s, and just 3% of users were more than 65 years old (elderly people). It was observed that MS was generally not busy with people at the weekend, which reflects that Tripoli's residents prefer to stay at home on Friday morning.

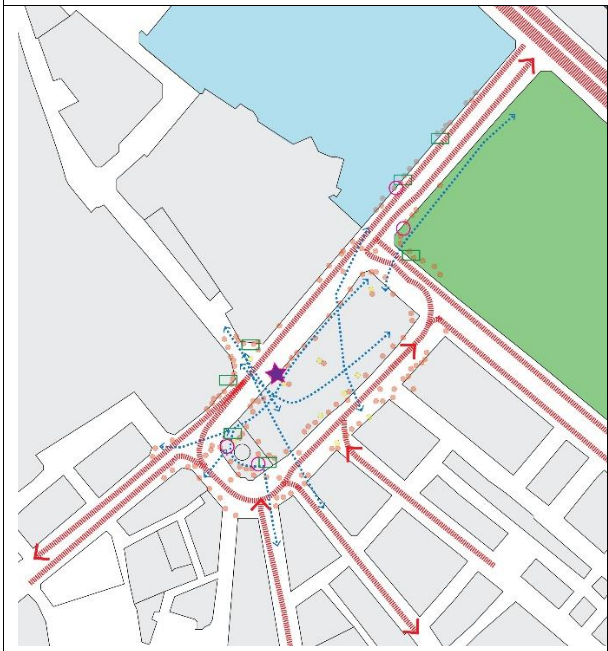
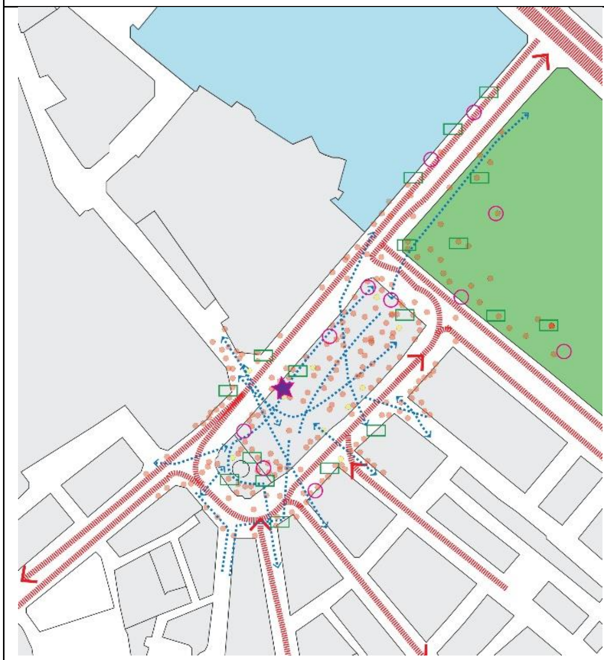
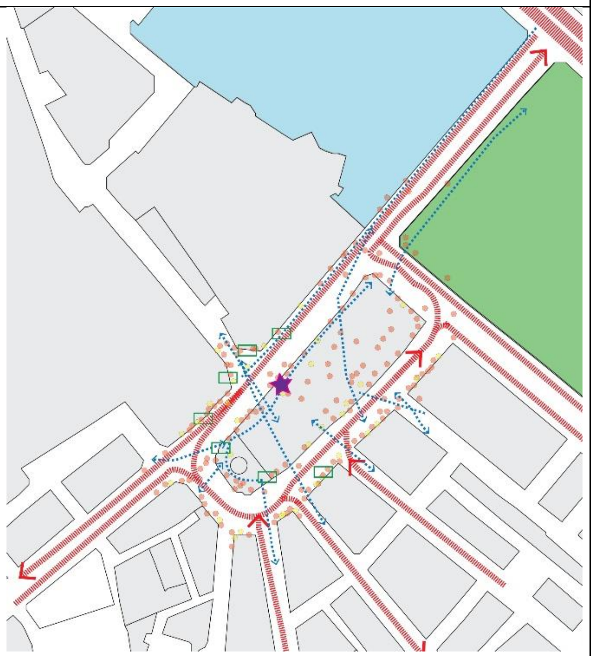
High-quality POS may hold necessary activities with approximately the same frequency as poor quality POS, but people tend to spend more time doing such activities in the former (Sholihah, 2016). Concerning activities in MS, walking was the significant action recorded for both genders (65%), followed by 18% for sitting and 16% for standing, and less than 1% were running. On the other hand, it was observed that 13% of pedestrians do not use the crosswalk for crossing streets around MS, especially the road between the seafront and the square. In addition, on the same day, the study shows that 4830 motor vehicles were travelling along the streets around MS, because most people visit the Square using their cars, taxis or private drivers, as Tripoli has no public transport system (Lakhder and Dugeny, 2010).

Table 8.5 Observation in Martyrs' Square, weekend

Martyrs' Square (HW/GC) Friday, 2-9-2016, weekend								
Observation elements	Time of observation							
	From	To	From	To	From	To	From	To
	8:00	8:30	14:00	14:30	18:00	18:30	23:00	23:30
Temperature	29°C		35°C		33°C		30°C	
Number of people	180		318		382		174	
Male	171		239		344		106	
Female	9		78		38		68	
Elderly (65+)	12		18		6		-	
People walking with children	-		24		22		18	
Under-18s	6		12		42		30	
People with prams	-		-		18		-	
People with wheelchairs	-		-		6		-	
Number using crosswalk	-		-		-		-	
Walk	135		195		203		153	
Sit	15		54		119		-	
Stand	30		67		57		17	
Run	-		2		3		4	
Number not using crosswalk for street crossing	30		66		42		-	
Number of vehicles	420		1620		1110		1680	
Number of shoppers	-		-		-		-	

Source: Author

Table 8.6 Four Seasons Observation in Martyrs' Square, weekend

Martyrs' Square Street Weekend Seasons	
	
Season 1	**Season 2**
	
Season 3	**Season 4**
Walking	Standing Area
Traffic way	Sitting Area
Male Users	Observation Point
Female Users	

Source: Author

8.2.2 Martyrs' Square weekday

According to the weekday observation in MS, 1486 people were recorded as involved in various activities within four times of observation on a weekday. As shown in Table 8.7, and Table 8.8, males represented 69% of users at the weekday, and while there were more female users in weekdays, reflecting the fact that most women using MS are employees (the number of female users was high at 8:00 to 8:30 and 14:00-14:30 compared to other times of observation, which is the daily work time in Libya). The highest number of users on weekdays was 50%, recorded in the evening time, while the lowest number of users was 12%, recorded at night time. Only 6% of pedestrians were under-18s, and 2% of the users were more than 65 years old (elderly people). A small number (4%) of users were walking with children, while less than 1% had a disability or were using a wheelchair.

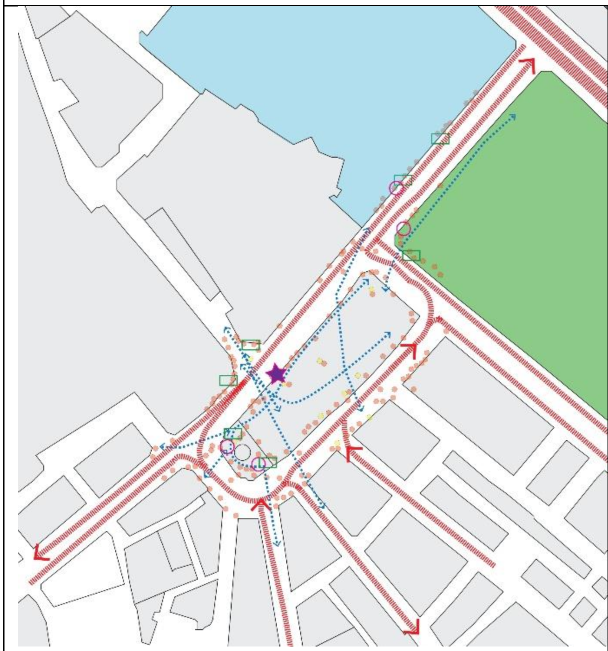
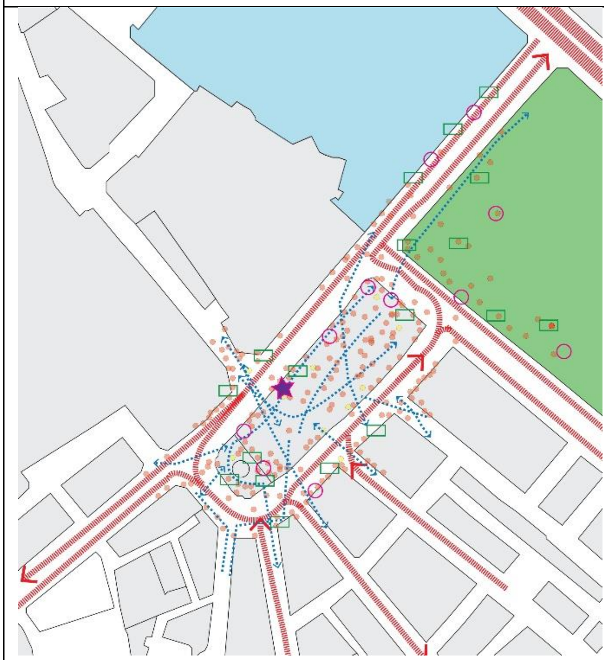
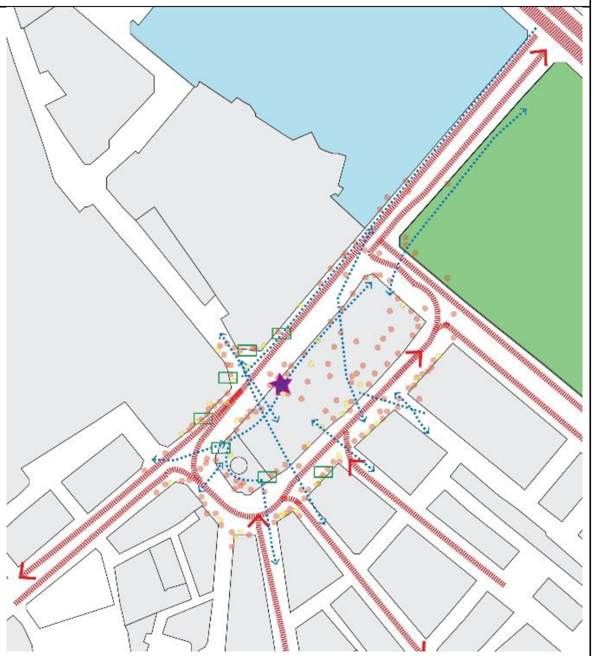
During the weekdays (working days), the overall amount of walking trips was estimated to be higher than during weekend days. The weather was sunny and bright, and the temperature was approximately 32°C, which is why people prefer to walk in MS in the evening time. Concerning activities in MS weekdays, walking was the primary action recorded for both genders, with 67%, followed by 17% standing, 14% sitting, and less than 1% running. On the other hand, it was observed that 24% of pedestrians did not use the crosswalk for crossing the streets around MS, especially the road between the seafront and the square. The number of motor vehicles was very high during weekdays, at 7711, and while it was lower at the weekend, at both times the number of vehicles around MS increases in the evening.

Table 8.7 Observation in Martyrs' Square, weekday

Martyrs' Square (LW/GC), Wednesday, 17-8-2016, workday								
Observation elements	Time of observation							
	From	To	From	To	From	To	From	To
	8:00	8:30	14:00	14:30	18:00	18:30	23:00	23:30
Temperature	29°C		35°C		33°C		31°C	
Number of people	270		264		748		204	
Male	148		128		561		194	
Female	122		136		187		10	
Elderly (65+)	12		6		16		-	
People walking with children	-		-		58		6	
Under-18s	-		12		58		6	
People with prams	18		-		36		12	
People with wheelchairs	-		-		2		-	
Number using crosswalk	-		-		-		-	
Walk	233		197		377		184	
Sit	12		26		159		8	
Stand	20		41		196		10	
Run	5		-		16		2	
Number not using crosswalk for street crossing	48		30		256		34	
Number of vehicles	1740		2220		2528		1223	
Number of shoppers	-		20		23		-	

Source: Author

Table 8.8 Observation in Martyrs' Square, weekday

Martyrs' Square Street Weekend Seasons	
	
Season 1	**Season 2**
	
Season 3	**Season 4**
Walking	Standing Area
Traffic way	Sitting Area
Male Users	Observation Point
Female Users	

Source: Author

8.2.3 Accessibility

This section concerns the issue of accessibility in MS. Field observation indicates that all transport modes, including cars, can easily reach MS. To evaluate MS quality in terms of accessibility, four points were assessed: connectivity, availability of public transportation, number of footpaths, and a number of significant barriers. Connectivity is a factor for street network patterns design in determines how pedestrians adapt with street environments, and the level of accessibility that makes space usable (Beavon et al., 1994). Figure 8-9 shows the average width of roads around MS: main roads are 16-18 meters, connecting roads are 10-11 meters, and track roads are 6 meters, as described in the previous section. This road network was mostly laid down under the Italian colonial occupation.

Population and car ownership increases have resulted in massive traffic jams everywhere in Tripoli city centre, almost preventing pedestrian movement and disrupting traffic-flow and access to service facilities. Along with the roads around MS, inconvenient crossing facilities, heavy traffic, a lack of pavements, and vehicle encroachment onto pavements further reduces pedestrian accessibility and creates severance effects along streets.

Finally, the observation shows that there are no much zebra crossings at important crossing points. In situations like these, there is a need for pedestrians to reclaim their rights to walk and demand for safe crossing points, especially in a situation of increased the used of the cars.

Figure 8-9 Junctions between (1) MS and Mizran Street; (2) MS and Old City; (3) MS and OMS in seafront site

Source: Author

Observation revealed that MS has no appropriate public transportation system except for an old private bus, which accesses only a few streets. Public services related to public transport as bus services, bus stations and bus stops are not available in MS. Due to the lack of public transportation tools, people have to take their private cars or taxi to reach MS. Carmona et al. (2003) illustrated that 'the public realm should be accessible to all, some environments are - intentionally or unintentionally less accessible to certain sections of society'. Figure 8-10 illustrates critical issues of pedestrian accessibility into MS; (a) and (b) show how old people in particular lack crosswalks and pedestrian facilities, while (c) and (d) show interference between pedestrians and vehicles.

Figure 8-10 Barriers facing users in MS

Source: Author

8.2.4 Pedestrian facilities

MS does not have a specific function; sometimes it is using as a place for social activities, and at other times it is used for car parking. It primary function from an urban planning perspective is as a rotary island. Askari (2014) explained that the main attractions of POS are facilities ‘such as creating places for eating, shopping, and doing different activities such as playing sports’. Figure 8-11 shows the pedestrian destinations and main attractions around MS. It can be clearly observed that there is a lack of user facilities in the Square, such as sites, shelters, trees, and waste disposal bins. There are no visitor facilities, such as drinking water fountains, toilets, or cafes. The local authorities do not provide any pedestrian crossing facilities or professional car parking, which exacerbates traffic problems around the Square, as drivers simply parking on surrounding roads.

Figure 8-11 Attraction point barriers to pedestrian pathways

Source: Author

8.2.5 Mixed land use

Most previous studies demonstrated the positive effect of land use for walkability, including enhancing physical activity by providing a range of destinations within walking distance, such as transit stations and grocery stores (Saelens and Handy, 2008). However, in MS mixed land use has an adverse impact on walkability, with most of the land use being devoted to commercial activities and government offices, resulting in surrounding streets being full of parked cars.

Despite land use regulations enacted in the 1990s to decentralize governmental and public administration institutions, to reverse the chronic over-concentration of Libya's institutions in Tripoli, the majority of major bureaucratic institutions are still concentrated in the capital, and there is a chronic lack of supporting parking facilities relative to requirements. The observation recorded no car parking in Tripoli city centre except one in the Green Park area near MS, which is woefully inadequate even to relieve the over-parking surrounding the Square.

Figure 8-12 shows the different space and building functions of surrounding environments within approximately 500 meters of MS. Busy shopping areas are mainly located around the MS, including on one side the Souks of the Medina, and shops proliferate on surrounding streets, including OMS, Um Hamad, Al Magarief, and 24th of December, making MS an essential destination for visitors and residents.

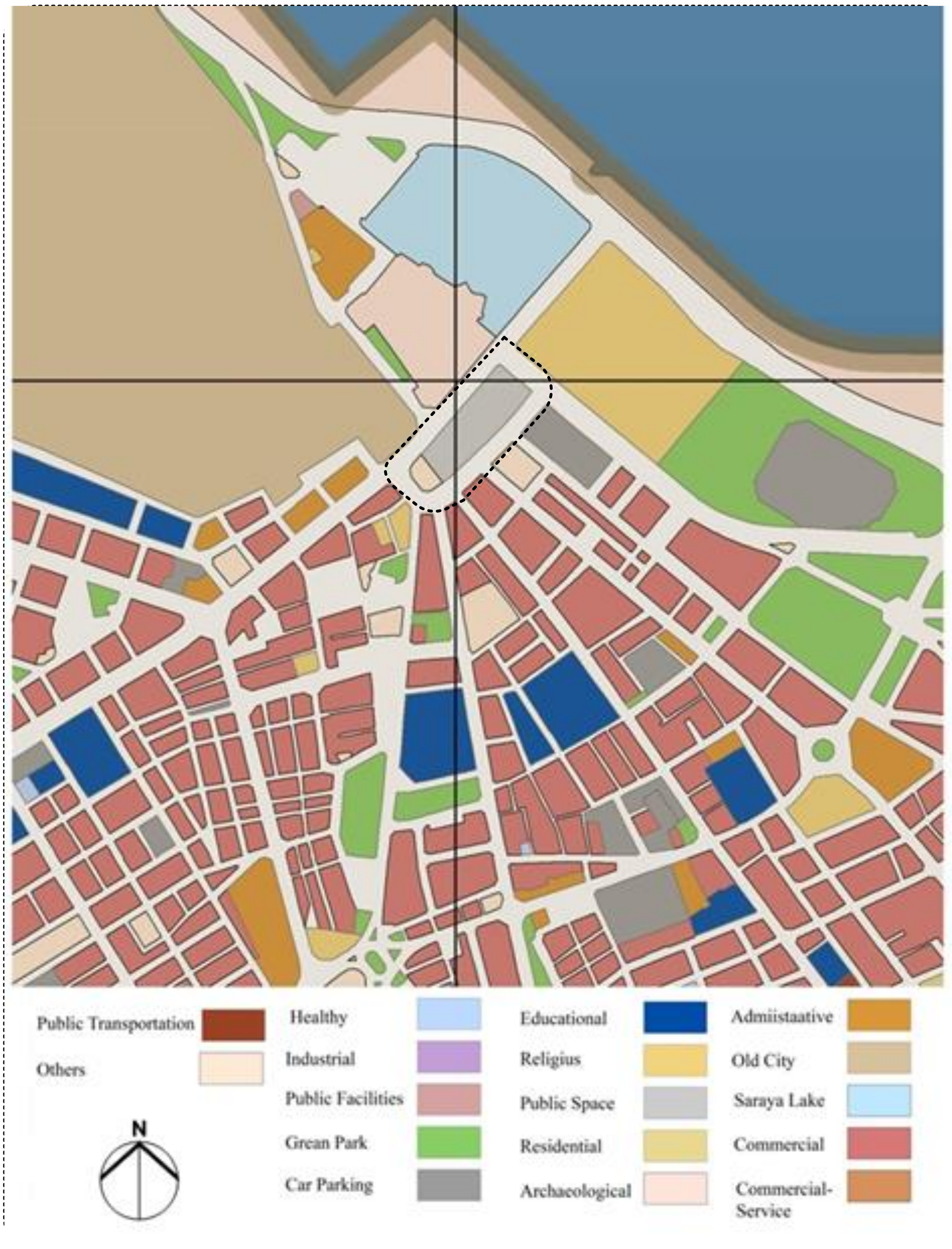


Figure 8-12 Land use around MS

Source: Author

8.2.6 Place aesthetics

According to Kahana et al. (2003), the aesthetic elements of POS, such as the general maintenance, air quality, and presence of trees, favour pedestrian walking. MS overlooks the most important historical sites and buildings in Tripoli city centre, including the Museum of Al-Saraya Al-Hamra, the Medina (Old City), the Turkish Market, Lake Saraya, River Park, Karama Courtyard and the Fountain Horses. Many Italian-era buildings are located on the edge of the MS, and the historical value of the area gives it latent interest for many tourists and visitors. Despite this potential, it was clearly observed that it lacks street furniture and street landscape; rubbish bins are left randomly in the square, and on the pavements, and there is poor maintenance and infrastructure.

8.2.7 Safety and security

As explained previously, safety and security in Libya must be understood in the context of the extraordinary context of the 2011 civil war and its aftermath, and personal safety and security is a particularly critical dimension for users of Libyan streets. Aside from conflict and violent crime, observations revealed a lack of adequate traffic safety infrastructure, such as traffic lights, marked crossings, and pedestrian ways. MS is bordered by a highway on the seaside, making it dangerous to go to the Cornice, with 87% of pedestrians crossing the street at random places. Also, observations indicate that the lack of regular maintenance of MS, including the streets around the square, appears to be a problem concerning the local authorities. The observation showed that the lack of lighting at night in MS, due to power outages for long hours, or the lack of regular maintenance of the lamps in MS, gives users a sense of insecurity.

8.2.8 Convenience and comfort

The visit to MS at rush hour gave a clear picture of the latent potential for MS as a spacious area with a sense of breadth, convenience and comfort to walk in, however traffic jams in the surrounding streets makes the area wholly uncomfortable, and the lack of seating makes any venture in the Square an arduous undertaking. There is a general lack of services and facilities at MS. Observation indicated no consideration or planning for refuse collection, and there were no rubbish bins within the Square. In addition, a lack of shelter and street furniture in MS was observed, offering no protection from extreme weather (Figure 8-13). The observation of MS illustrated another issue which hampers opportunities for walking comfortably, which is the absence of public toilets in MS, except those in mosques, which are open only at prayer times, or restaurant toilets, which are reserved for customers only.

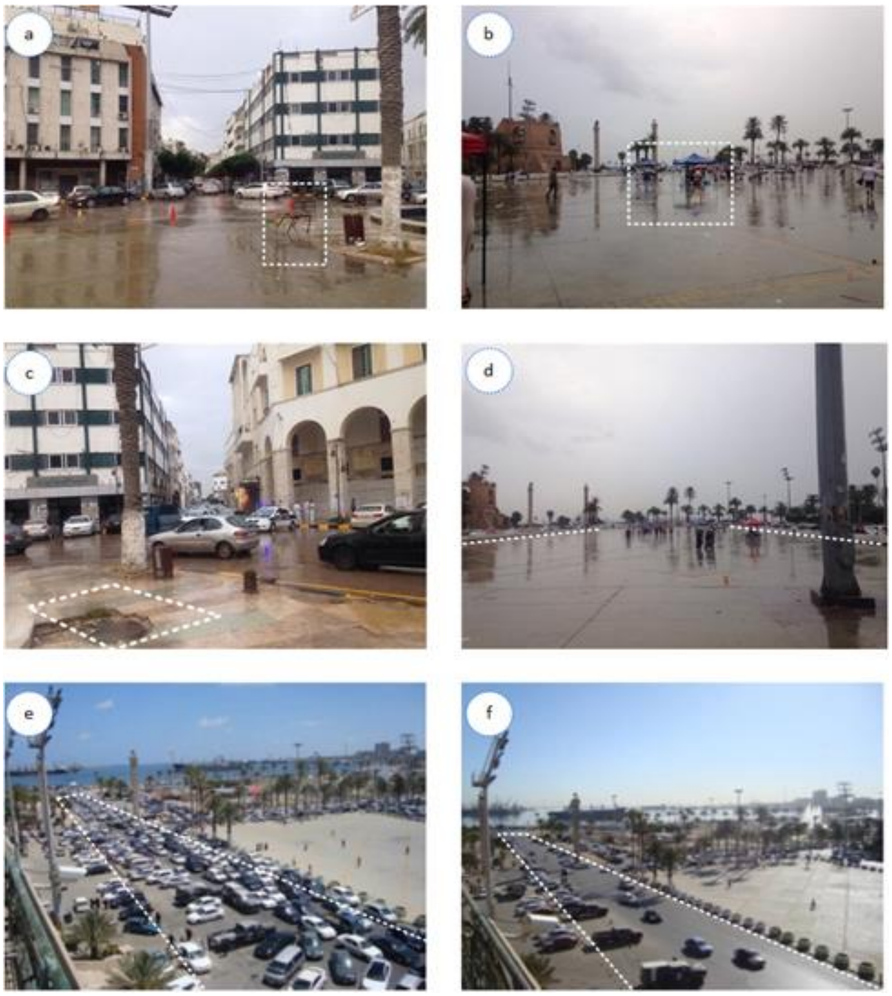


Figure 8-13 Various features of MS

a. lack of seating, b. lack of shelter, c. lack of maintenance of pedestrian pathway, d. lack of street furniture, e. traffic jam in rush hour (8:00 a.m), f. shows normal traffic

Source: Author

8.3 Algeria Square (AS) as low walkable open space with good environment condition (LW/GC)

AS was selected as third case study location in this thesis. Figure 8-14 shows that AS is located in the Italian Quarter, as the government in the colonisation period focussed on managing the city of Tripoli through the development of representative colonial municipalities, starting with Tripoli Cathedral around AS (Fuller, 2007). The second period of the Italian colonisation was a significant period in Tripoli's history, reflected in political, economic, urban, and administrative transformations. Moreover, most of the buildings around AS built during that time were municipality buildings, including the Post Office and Cathedral. Abdelatif Allous (2016) stated in his architectural study of Tripoli's historical municipal architecture:

> 'It seems reasonable to say that the Fascist rulers in Tripoli had a clearer colonial vision and were keen to establish purposefully designed civic, municipal institutions for the modern 1930s to match their other urban developments and demographic and imperial programmes'.

The square constructed around 1939 as Cathedral Square (i.e. AS) was the newly developed city urban centre of Tripoli (Figure 8-14, 'C'). Nowadays, the Italian Quarter is regarded as the most prominent mixed land use area in Tripoli city centre, containing a wide variety of services such as public institutions, banks, commercial stores, and leisure facilities.

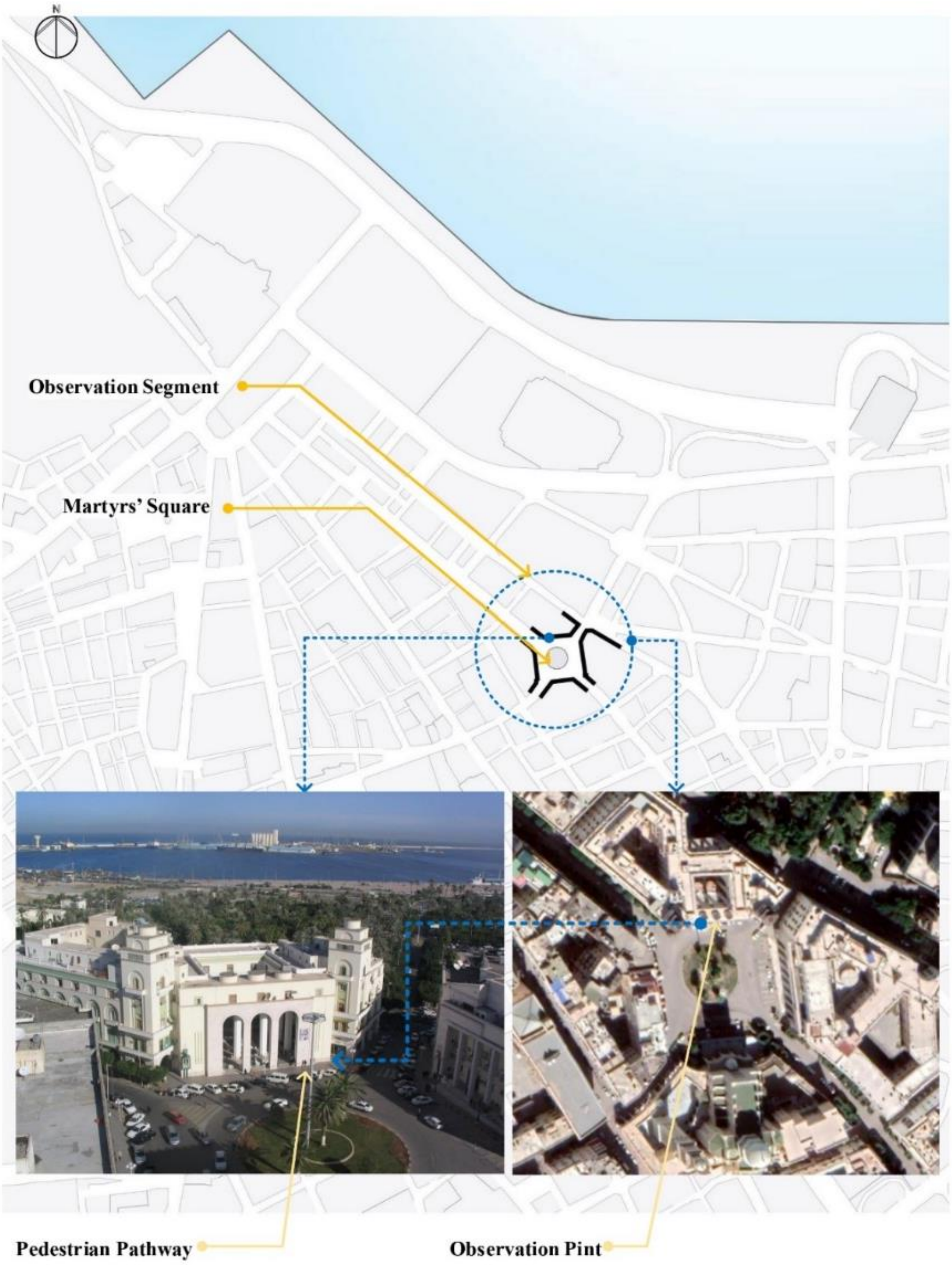


Figure 8-14 AS as low walkable open space with good environment condition

Source: Author

8.3.1 Algeria Square weekend

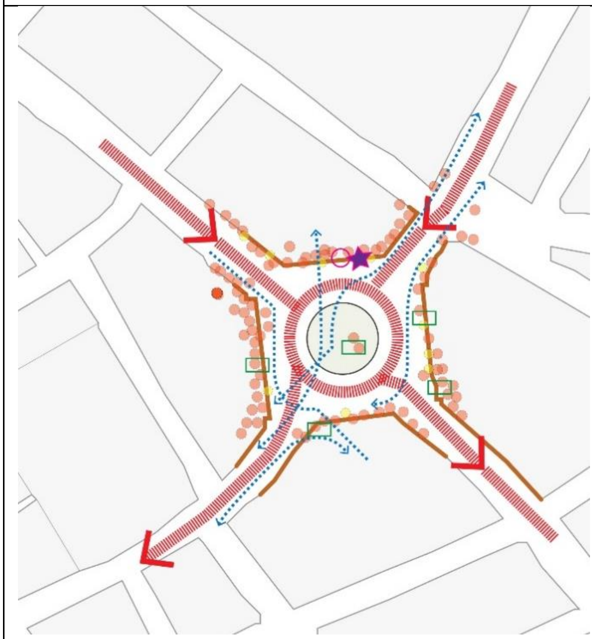
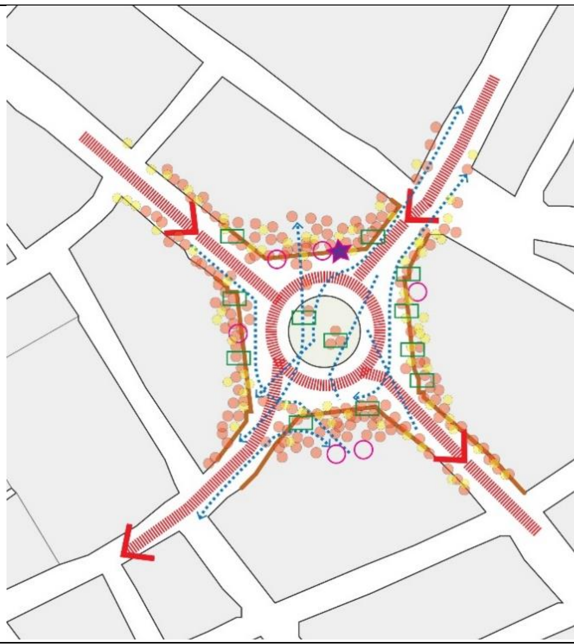
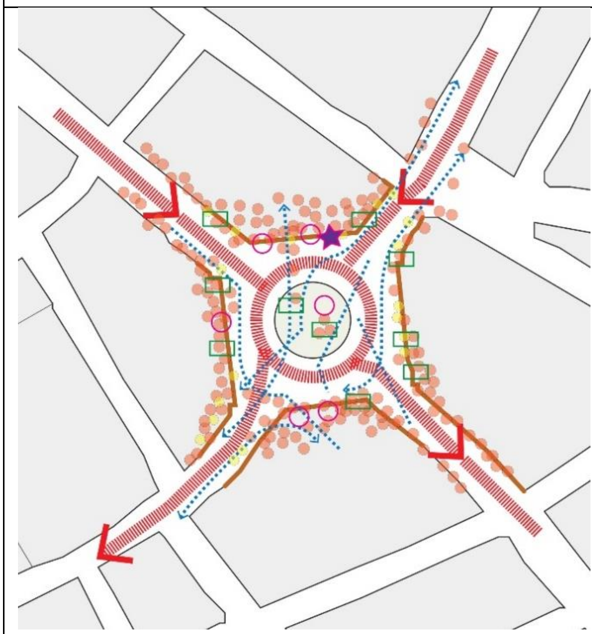
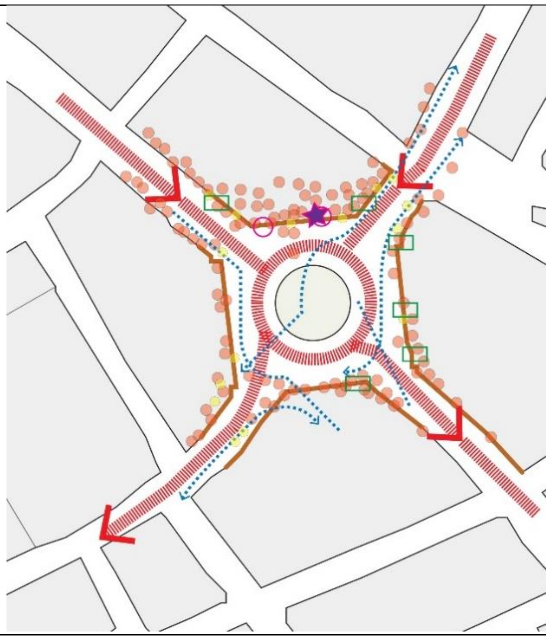
AS observations were conducted over four sessions. As AS is a small square in Tripoli, the observation points were selected strategically to achieve all the visuals inside the square. This section explores the users in AS by gender, activities, type of users, time of use, and way of use. As shown in Table 8.9, Table 8.10 and 1456 people were recorded engaging in various activities within the four observations at the weekend, using the walk-by pedestrian count technique. The study indicates that males represented 80% of the users at the weekend, while the highest number of users at weekends was 41%, recorded in 14:00 to 14:30, and the lowest number of the users was 10%, registered in the morning time. Only 4% of pedestrians were under-18s. It was observed that AS had relatively low population density at the weekend, reflecting that Tripoli's residents prefer to stay at home on Friday mornings. Regarding activities, walking was the primary action recorded for both genders (65%), followed by smaller proportions of 30% standing and 4% siting. No pedestrian was observed to use the crosswalk for crossing the streets around AS. In addition, on the same day, the study shows that 2,094 motor vehicles were travelling along the streets around AS, which is much lower than the equivalent value for MS.

Table 8.9 Observation in Algeria Square, weekend

Algeria Square (PLW), Friday, Weekend								
Observation elements	Time of observation							
	From	To	From	To	From	To	From	To
	8:00	8:30	14:00	14:30	18:00	18:30	23:00	23:30
Temperature	29°C		35°C		31°C		31°C	
Number of people	156		606		492		202	
Male	145		388		458		186	
Female	11		218		34		16	
Elderly (65+)	-		12		30		24	
People walking with children	-		6		18		12	
Under-18s	12		6		30		18	
People with prams	-		-		-		6	
People with wheelchairs	-		-		6		-	
Number using crosswalk	-		-		-		-	
Walk	146		443		198		164	
Sit	4		37		22		2	
Stand	6		126		272		36	
Run	-		-		-		-	
Number not using crosswalk for street crossing	120		162		90		90	
Number of vehicles	-		672		732		690	
Number of shoppers	-		18		60		-	

Source: Author

Table 8.10 Four Seasons of Observation in Algeria Square, weekend

Algeria Square Street Weekend Seasons	
	
Season 1	**Season 2**
	
Season 3	**Season 4**
Walking	Standing Area
Traffic way	Sitting Area
Male Users	Observation Point
Female Users	

Source: Author

8.3.2 Algeria Square weekday

The observation in AS on weekdays recorded 2382 users involved in various activities within four times of observation. As shown in Table 8.11 and Table 8.12 males represented (62%) of users at the weekend, with a markedly higher number of female users (38%) than at the weekend, reflecting that most of the women using AS are employees (the number of female users was high at 8:00 to 8:30 and 14:00-14:30 compared to other times of observation, which is the daily work time in Libya). The highest number of users on weekdays was 37%, recorded in the evening, while the lowest number of the users 10%, registered from 14:00 to 14:300. Likewise, 20% were of the users' number recorded at 23:00 to 23:30 session, and this percentage is high compared to the observation at the other case study sites. This is because the Tripoli City Council building is located in AS, and the security is very high in this area. During the weekdays (working days), the overall amount of walking trips was estimated to be higher than during weekend days. The weather was sunny and bright, with the highest temperature of 35ºC.

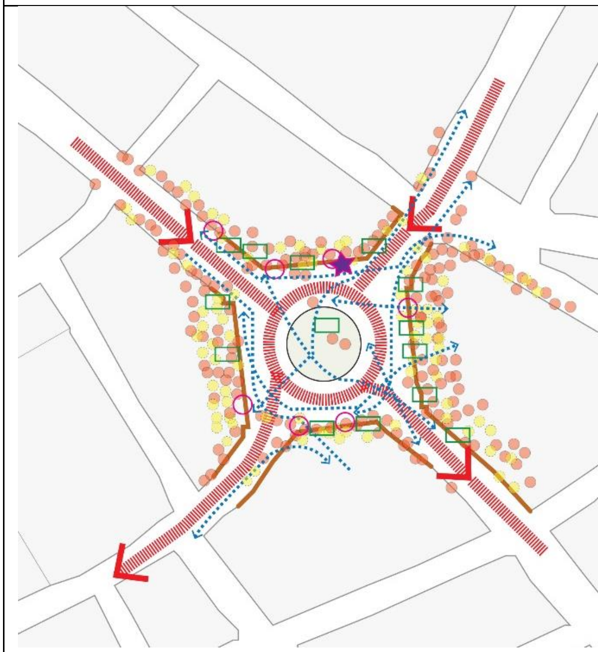
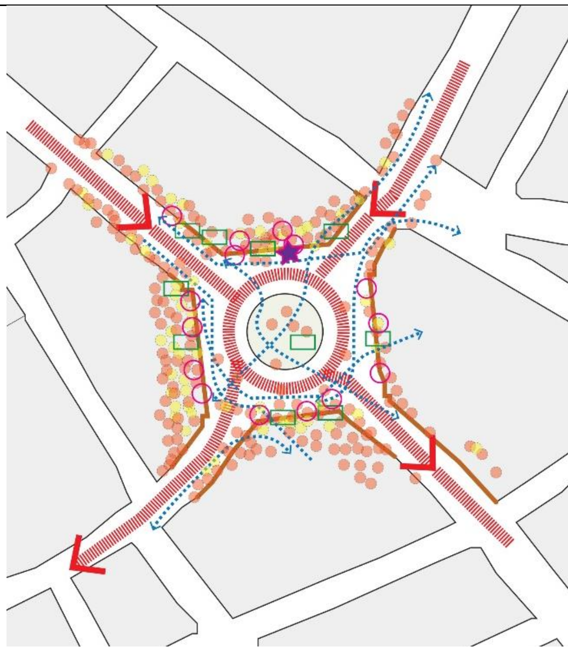
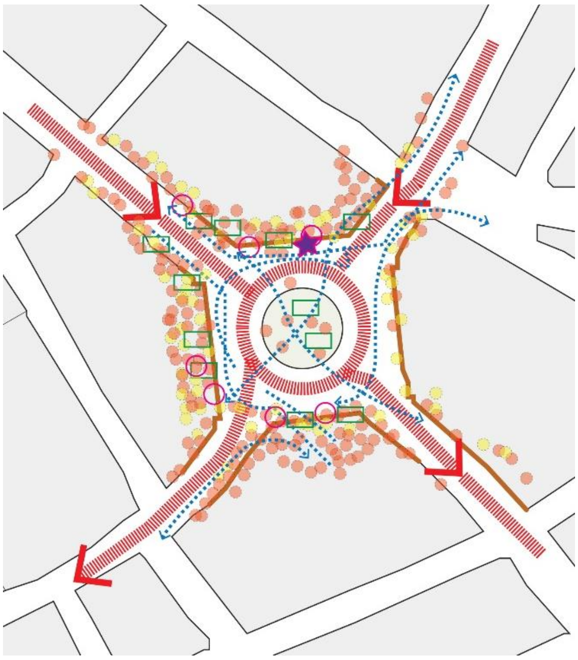
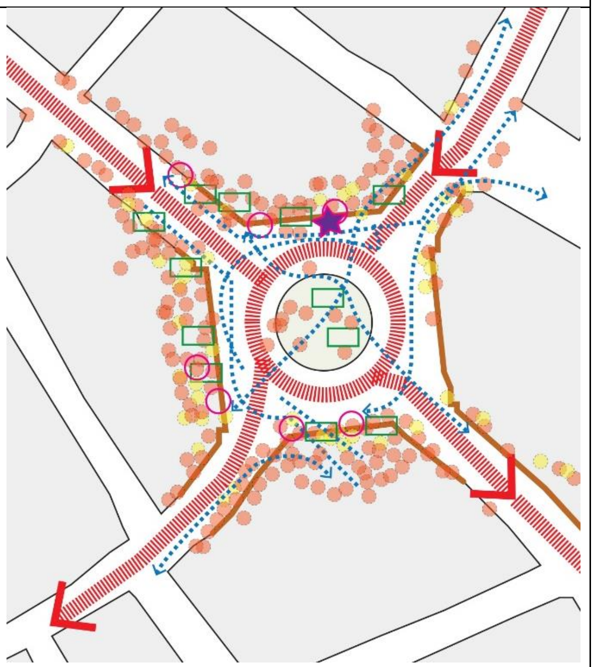
Regarding activities in AS at weekdays, 64% of the activities comprised walking, followed by 18% standing, 16% sitting, and less than 1% were running. It was observed that 12% of pedestrians did not use the crosswalk for crossing the streets around AS. The observation method showed that the number of motor vehicles travelling was 1128, which is lower than the weekend time. However, the number of vehicles around the AS increases in the afternoon. Moreover, the researcher was able to observe the female pedestrians during the night time, although their numbers were very limited, in this AS. Whenever they were observed, they always kept a distance from male pedestrians or the males were attentive to maintain a distance.

Table 8.11 Observation in Algeria Square, weekday

Algeria Square (PLW), Monday, 29-8-2016, weekday								
Observation elements	Time of observation							
	From	To	From	To	From	To	From	To
	8:00	8:30	14:00	14:30	18:00	18:30	23:00	23:30
Temperature	29°C		35°C		32.5°C		31°C	
Number of people	700		258		900		524	
Male	302		119		648		393	
Female	380		139		252		131	
Elderly (65+)	42		18		42		24	
People walking with children	-		-		12		12	
Under-18s	6		6		6		12	
People with prams	-		-		-		-	
People with wheelchairs	-		6		6		-	
How many used Crosswalk	-		-		-		-	
Walk	529		126		566		321	
Sit	35		67		125		165	
Stand	131		65		209		36	
Run	6				-		2	
Number not using crosswalk for street crossing	84		42		78		96	
Number of vehicles	210		498		216		204	
Number of shoppers	240		18		360		-	

Source: Author

Table 8.12 Four Seasons of Observation in Algeria Square, weekday

Algeria Square Street Weekday Seasons	
	
Season 1	**Season 2**
	
Season 3	**Season 4**
Walking	Standing Area
Traffic way	Sitting Area
Male Users	Observation Point
Female Users	

Source: Author

8.3.3 Accessibility

Accessibility can be defined as the access ability to public spaces. Mariela Alfonzo (2005) recommended that spatial accessibility is considered as the most fundamental aspect of the built environment that affects individuals' decisions to walk. Field observation indicates that AS is easily reached by all transport modes, including cars, private taxis, and private microbuses and coaches. To evaluate AS quality regarding accessibility four points were assessed: connectivity, availability of public transportation, the number of footpaths, and many significant barriers. The average width of the main roads into AS as 16-18 meters, connecting roads as 10-11 meters, and track roads a 6 meters in width, as with the previous case study sites, but due to the relatively smaller size of AS it is more congested and more difficult for people to walk through, as discussed below.

Figure 8-15 shows some keys issues in AS in terms of accessibility, including the ubiquity of traffic and traffic jams, obstructing pedestrian movement, traffic-flow, and access to service facilities. Moreover, along the roads into/out to AS there are pavements in good condition, but potential users are barred access due to cars parking on the pavements, especially at prayer times, as the Square is used as car parking for the Gamal Abdel Nasser Mosque.

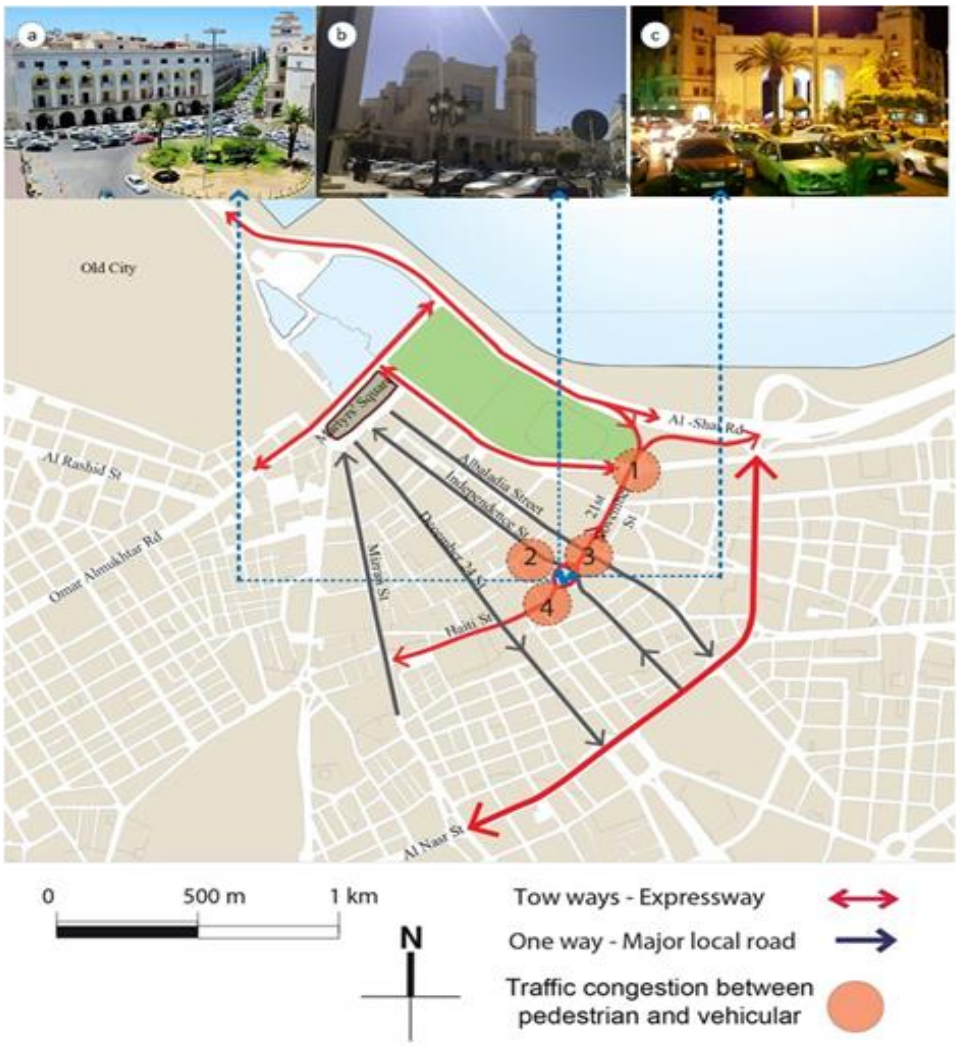


Figure 8-15 Junctions (1-4) between AS and surrounding streets and use for car parking (photos a-c)

Source: Author

Carmona et al. (2003) described that POS are areas ‘where anyone has a right to come without being excluded because of design, economic or social barriers’. AS is a key site for cultural heritage in Tripoli and a great potential POS, but which has severe barriers to accessibility, in effect excluding users due to design. Figure 8-16 displays some critical issues of pedestrian accessibility into AS, most fundamentally the lack of crosswalks and pedestrian facilities, and interference between pedestrians and vehicle ways around the areas. There is no public transportation around AS, and most users are local people who live nearby, those from elsewhere in Tripoli who arrive by private cars (and park in the surrounding streets), and some travellers who arrive from other cities by private coaches.

Figure 8-16 Lack of pedestrian access

Source: Author

8.3.4 Pedestrian facilities

AS was chosen as one of the case studies not just because it is a POS, but because of the great value of the buildings and activities in the area and surrounding streets. Regarding the observation within the study, the site reveals the complex between pedestrians and traffic in streets adjoining the pedestrian pathway. Also, the observation recorded a very high number of private cars, especially at peak times, such as prayer times or working hours, with no car parking facilities provided, as shown in Figure 8-17. As explained previously the lack of parking causes the obstruction of pedestrian pavements, and no pedestrian crossing facilities are provided.

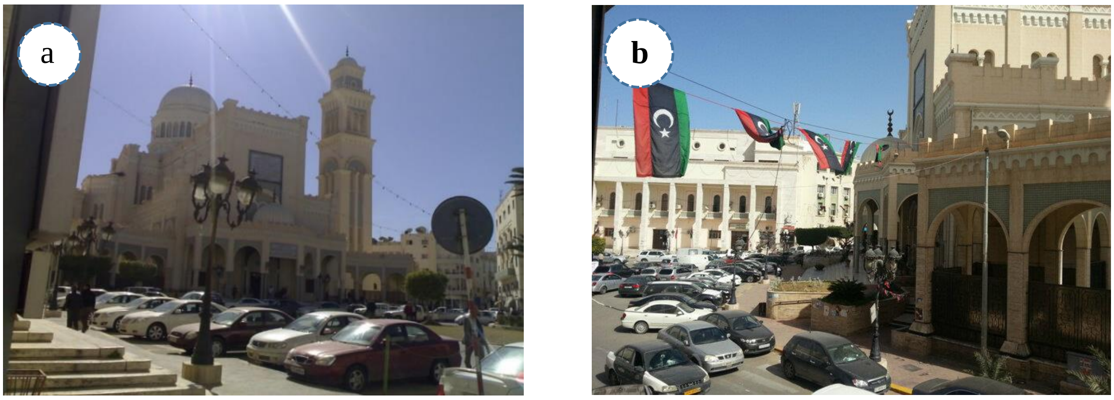


Figure 8-17 Pedestrian pathways

Source: Author

As noted by Whyte (1980), sitting spaces are one of the most important elements in attractive POS, and supporting social behaviour. Observation recorded a lack of seating in AS, as well as of public toilets, except those of Gamal Abdel Nasser Mosque, which is only open around prayer times. Nevertheless, compared to the other case study areas, AS has relatively good pedestrian facilities in terms of street lights, street furniture, and street landscape.

8.3.5 Mixed land use

Yang (2008) conducted a study based on secondary data to examine the effect of the land-use mix on users' satisfaction in two metropolitan cities in the USA. The study showed that the mixed land uses were associated with higher user satisfaction. Figure 8-18 shows the space and building functions of the surrounding environments within almost 500 meters of AS.

Figure 8-18 Land use around AS

Source: Author

As explained in the previous sections and shown in Figure 8-19, AS contains a collection of historic buildings, whose usage has varied over the time. Gamal Abdel Nasser Mosque is one of the main buildings located in AS. It was initially an austere, neo-Romanesque Catholic cathedral, and the urban block confronting the Cathedral from the north is also a significant public institution. The Aurora Gallery, designed to house the offices of the Fascist National Institute of Social Security/Welfare, is nowadays used as aurora gallery cafe (El-Allous, 2016). Tripoli Municipality Building still hosts Tripoli's City Council today. Concerning land uses, AS has relatively mixed of land use. Most of the streets contain commercial activities and government offices, which makes the streets full of cars and exacerbates the general daily problem of traffic and overcrowding in Tripoli city centre. Furthermore, the observation recorded no car parking in Tripoli city centre except Green Park, as mentioned previously. Most shops in this area are open during the day and closed at night. Moreover, along this type of street, buildings are typically over 3-4-storeys, which results in commercial activities on the ground floor level and residential uses on the upper floors. It is also worth mentioning that the spaces between buildings, overlooking the street, are narrow and do not exceed 5m, at most.

8.3.6 Place aesthetics

Nyagah (2015) defined aesthetics as environments ‘offering pleasant and visual interests that induce an appreciation of the walking environment, articulated buildings, and excellence in landscaping’. The second Italian colonial developed the Tripoli city urban centre of AS, and the structure of the buildings around the Square were carefully designed to give a number of advantages, including aesthetics spaces, fascist architectural style, and an important position in the city centre’s new form in the north-eastern corner of the square (El-Allous, 2016). Figure 8-19 shows Masjid Gamal Abdel Nasser, remodelled with Islamic elements (e.g. (a) a plain exterior and (b) Moorish courtyard, while the fascist structure remains in the monumental porticos), while (c) shows the Square, its daytime traffic, and proximity to the sea, and (d) shows the colonial municipal building, which is the modern Post Office centre. AS is one of the few places in Tripoli that contain good quality and clean spaces, but it lacks soft landscaping such as trees in the streets around the Square itself.

Figure 8-19 Views of Masjid Gamal Abdel Nasser, Algeria Square, and Post Office (a) Masjid Gamal Abdel Nasser night view, (b) Masjid interior, (c) aerial view of Algeria Square and sea, (d) Italian colonial municipal building (Post Office)

Source: Author

8.3.7 Safety and security

Walking might be deterred by lack of security and safety or perceived lack of safety and security (Gehl, 1986). Nowadays, the general impression in Libya is the feeling of unsafety and insecurity, however AS is one of the most secure spaces in the city, with a strong police presence during most of the day and night, due to the location of Tripoli City Council in the area. Activities are common later into the night due to Masjid Gamal Abdel Nasser, which also induces a feeling of safety and security, encouraging users to stay and walk in the area. However, away from the Square itself, the surrounding dark sub-streets are not considered safe. Figure 8-20 shows the lack of car parking and traffic jams into and out of AS, interfering with both cars and pedestrians. Furthermore, the observation showed that the lack of lighting at night in AS, due to power outages for long hours or the lack of regular maintenance of the street lights in AS, gives the users a sense of insecurity.

Figure 8-20 Lack of traffic lights and pedestrian crosswalk

Source: Author

8.3.8 Convenience and comfort

Due to the heavy concentration of institutions and indeed human residents in Tripoli, as the capital city of Libya, it has massive traffic density that fundamentally militates against walkability, particularly in public planning contexts that prioritise automobiles. Southworth (2005, p. 248) defined walkability as ‘the extent to which the built environment supports and promotes walking by providing for pedestrian’. AS is an excellent example in Tripoli of achieving a balance between convenience and comfort and walkable public spaces. Compared to the other case study spaces, AS is quite comfortable for walking, and it is clean, with good conditions of pedestrian pathways, as shown in Figure 8-21 (a, b), while the same Figure (c, d) also shows garbage piled up in the surrounding streets. No crosswalks or traffic lights were observed, making walking in AS uncomfortable because of the interference between pedestrians and cars, especially in intersections between AS and the streets around it.

Figure 8-21 Top: good condition of pedestrian pathways, Bottom: garbage piled up in streets around AS

Source: Author

8.4 Al-Rasheed Street (RS) as high walkable open space with poor environment condition (HW/PC)

Figure 8-22 shows Al-Rasheed Street (RS), located on the northern coastline of Tripoli. It is one of the main commercial areas in the city, selected by the experts in Delphi method as a high walkable open space with poor environment condition. RS is approximately 550 m long and about 20 m wide. It is the main road link the city centre (MS and OMS) and the business centre (high rise buildings). RS is also of historical value, with the oldest fish market, and it is one of the most popular shopping places in Tripoli.

Figure 8-22 RS as high walkable open space with poor environment condition

Source: Author

8.4.1 Al-Rasheed Street weekend

This section explores the users in RS by gender, activities, type of users, time of use, and way of use. The four observations recorded 3148 people engaged in various activities at weekends, using the walk-by pedestrian count technique (Table 8.13 and Table 8.14). The study indicates that males represented 88% of the users at the weekend, while the highest number of users at weekends was 43%, recorded from 18:00 to 18:30, while the lowest number of users was 14%, recorded in the morning. Only 2% of pedestrians were under-18s, and most of them were recorded at 23.00-23.30. Also, it was observed that RS is full of people in the evening, because RS is one of the favourite shopping places in Libya. As it is a commercial street, the main activity is shopping. Walking was the significant physical action recorded for both genders (70%), followed by 22% standing and 7% siting. It was observed that less than 1% of users were using prams, and less than 1% were using disabled wheelchairs. No pedestrians were observed using the crosswalk to cross the Street. The study recorded 1567 motor vehicles travelling along the RS, not including parked cars.

Table 8.13 Observation in Al-Rasheed Street, weekend

Al-Rasheed Street (HW/PC), Friday, weekend								
Observation elements	Time of observation							
	From	To	From	To	From	To	From	To
	8:00	8:30	14:00	14:30	18:00	18:30	23:00	23:30
Temperature	29°C		35°C		31°C		29°C	
Number of people	444		828		1356		520	
Male	391		770		1112		499	
Female	53		58		244		21	
Elderly (65+)	30		36		72		30	
People walking with children	-		18		48		12	
Under-18s	-		24		18		48	
People with prams	6		18		6		4	
People with wheelchairs	6		-		6		-	
How many used crosswalk	-		-		-		-	
Walk	371		435		991		421	
Sit	10		95		105			
Stand	63		289		260		88	
Run	-		9		-		-	
Number not using crosswalk for street crossing	66		120		300		114	
Number of vehicles	361		606		366		234	
Number of shoppers	36		240		360		180	

Source: Author

Table 8.14 Four Observation Season in Al-Rasheed Street, weekend

Al-Rasheed Street Weekend Seasons	
	
Season 1	**Season 2**
	
Season 3	**Season 4**
Walking	Standing Area
Traffic way	Sitting Area
Male Users	Observation Point
Female Users	

8.4.2 Al-Rasheed Street weekday

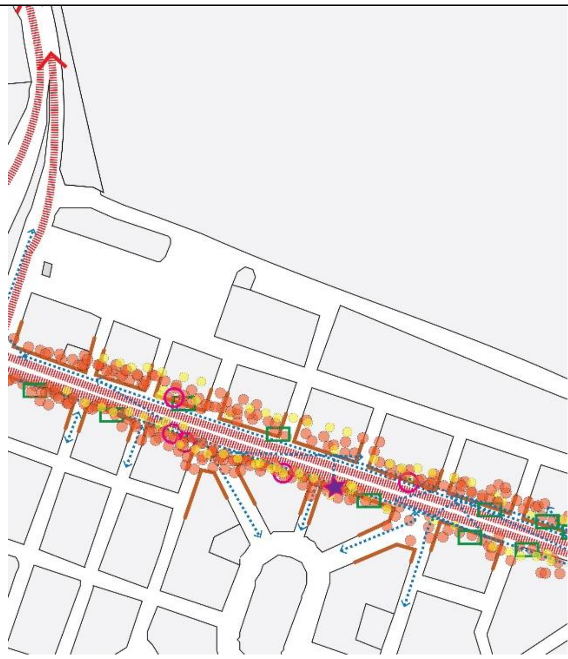
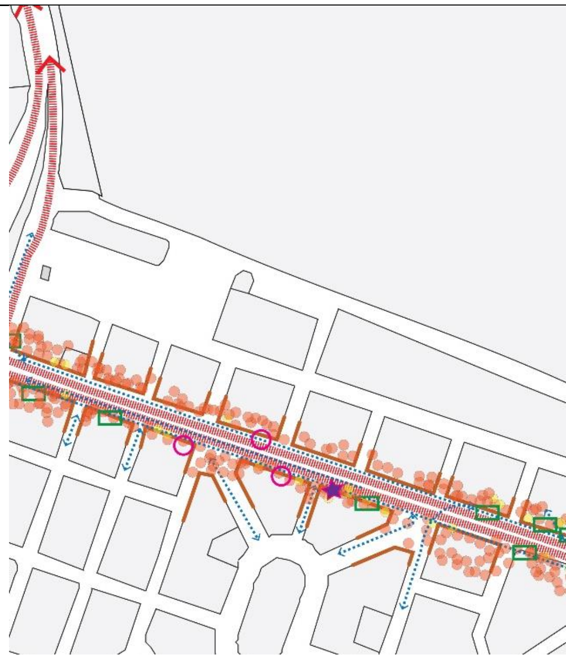
The observation in AS recorded that 3712 of the users involved in various activities within four times of observation duration on a weekday. As shown in Table 8.15 and Table 8.16 males represented 79% of users at the weekend, while the number of female users on weekdays was 21%, more than the number of female users at the weekend, reflecting that most of the female users of RS are employees. The highest number of users on weekdays was 36%, recorded in the evening session, while the lowest number of users was 11%, recorded in morning. Similarly, 22% of users were recorded during the 14:00 to 14:30 session. During the weekdays, the overall amount of walking trips was estimated to be higher than during weekends. The weather was sunny, and the highest temperature was 35°C.

Table 8.15 Observation in Al-Rasheed Street, weekday

Al-Rasheed Street (HW/PC), Monday, Weekday								
Observation elements	Time of observation							
	From	To	From	To	From	To	From	To
	8:00	8:30	14:00	14:30	18:00	18:30	23:00	23:30
Temperature	29°C		35°C		32.5°C		31°C	
Number of people	660		648		1740		664	
Male	521		499		1305		631	
Female	139		149		435		33	
Elderly	36		84		30		17	
People walking with children	-		6		72		12	
Under-18s	6		30		60		51	
People with prams	-		12		6		12	
How many used crosswalk	-		-		-		-	
Walk	531		340		923		542	
Sit	55		125		340		-	
Stand	74		179		401		122	
Run	-		4		6		-	
Number not using crosswalk for street crossing	114		378		110		114	
Number of vehicles	150		420		276		235	
Number of shoppers	198		320		622		192	

Source: Author

Table 8.16 Four Observation Sseasons in Al-Rasheed Street, weekday

Al-Rasheed Street Weekday Seasons	
	
Season 1	**Season 2**
	
Season 3	**Season 4**
Walking	Standing Area
Traffic way	Sitting Area
Male Users	Observation Point
Female Users	

Source: Author

8.4.3 Accessibility

Poor accessibility in POS is one of the major deterrents affecting use (Pasaogullari and Dortali, 2004), who stated that ‘once a public space is accessible, other factors have also a role to play in defining and affecting the quality of the public space, which in turn, increase its utilisation by citizens’. To evaluate RS’s accessibility field observation was undertaken. The observation indicated that RS is easily reached by all transport modes, including cars, private taxis, private microbuses, and coaches. A review of the current road network around RS `indicates that the average width of the main road into RS is 16-18 meters, connecting roads are 10-11 meters, and track roads are 6 meters in width, as in the previous sections. Additionally, observation indicates that the RS has no appropriate public transportation system except old private buses. Public services related to public transport such as bus services, bus stations, and bus stops were not available.

The vehicular lanes of most streets connected to RS carry one-way traffic, and the high amount of vehicles, particularly during the daytime and holidays, has triggered traffic congestion around RS, aggravated be cars cutting across lanes and parking. There is a variety of pavements along RS, including covered pavements in front of shops (comprising an arcade of about 2 metres width) at both sides of the street. Also, the pavements gets narrow at some points of the street due to the lack of building law enforcement.

Figure 8-23 shows the keys issues of RS in terms of accessibility, as the root problem is that the city centre is overwhelmed with cars, causing traffic jams everywhere in the city centre, and inhibiting pedestrian movement as well as traffic flow itself, obstruct access to service facilities. Moreover, RS has poor pavements, and users faces the lack of accessibility due the lack of car parking, especially in the afternoon and evening, as shown in Figure 8-23 (a). Furthermore, along segments of the street with no crossing lines, risk-averse pedestrians opt to use the street. Figure 8-23 (b) shows that the main problem faced by the elderly was the lack of crosswalk and pedestrian facilities, while pic (a) shows interference between pedestrians and vehicle ways around the areas. On the other hand, some activities such as siting, standing, and selling goods block pedestrian pathways and sub-streets in and around RS, which are essentially unwalkable streets; this problem is especially acute in RS.

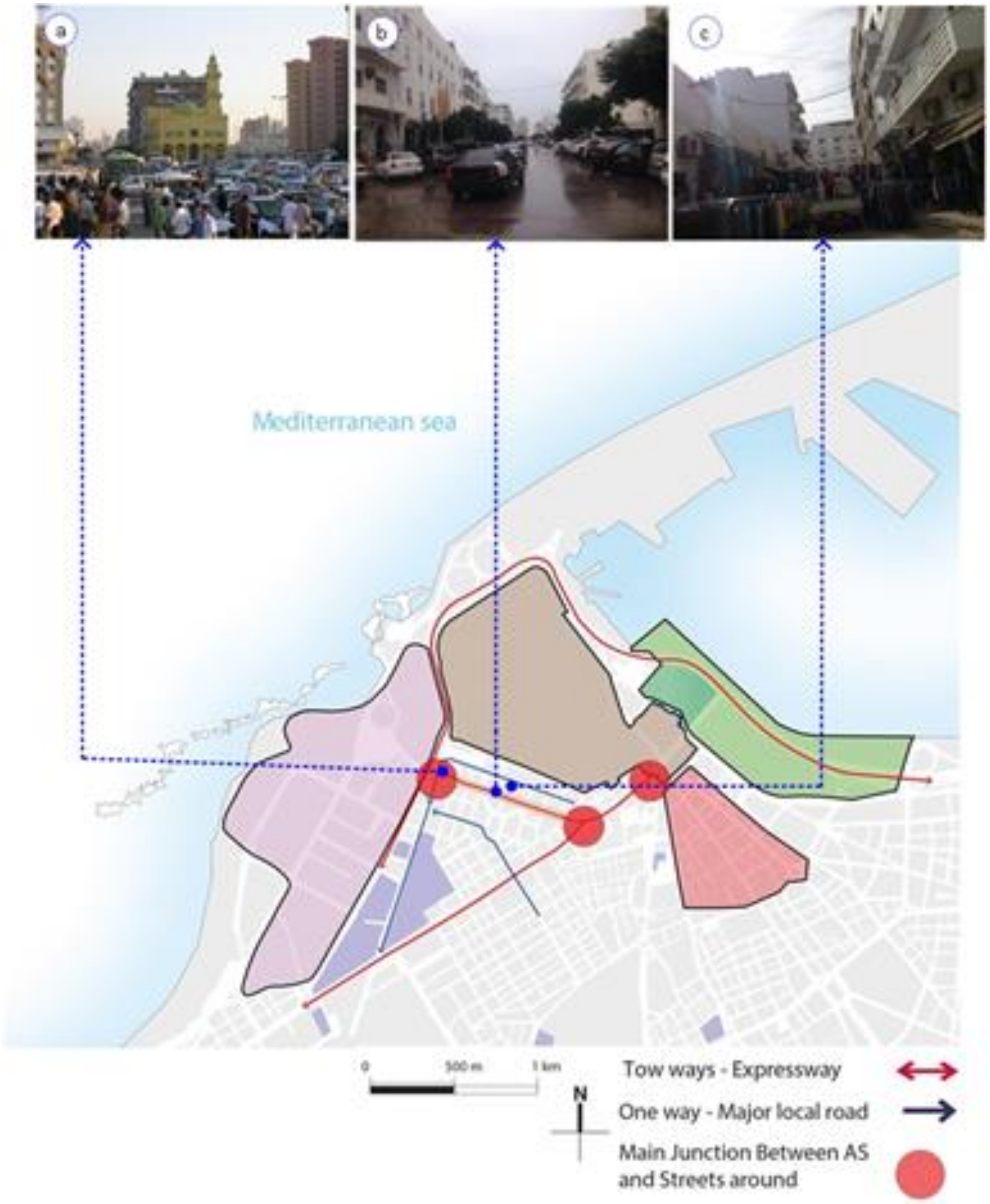


Figure 8-23 Use of RS and surrounding streets for car parking

Source: Author

8.4.4 Pedestrian facilities

Powell et al. (2004) argued that a lack of pedestrian facilities is a significant barrier to physical activity, playing a role in increased health disparities. RS was chosen as high walkable open space with poor environment condition. Retail shops comprise the most significant activities throughout RS, and a large number of trips were observed to be for shopping. Also, it was observed that the rate of walking to/from RS was the highest number of all the case study areas. However, pedestrian facilities are important in affecting mode choice. Observation in RS revealed complex confrontations between pedestrians and traffic in adjoining streets, and the number of private cars was very high, especially in the evening, with no car parking facilities provided (Figure 8-24).

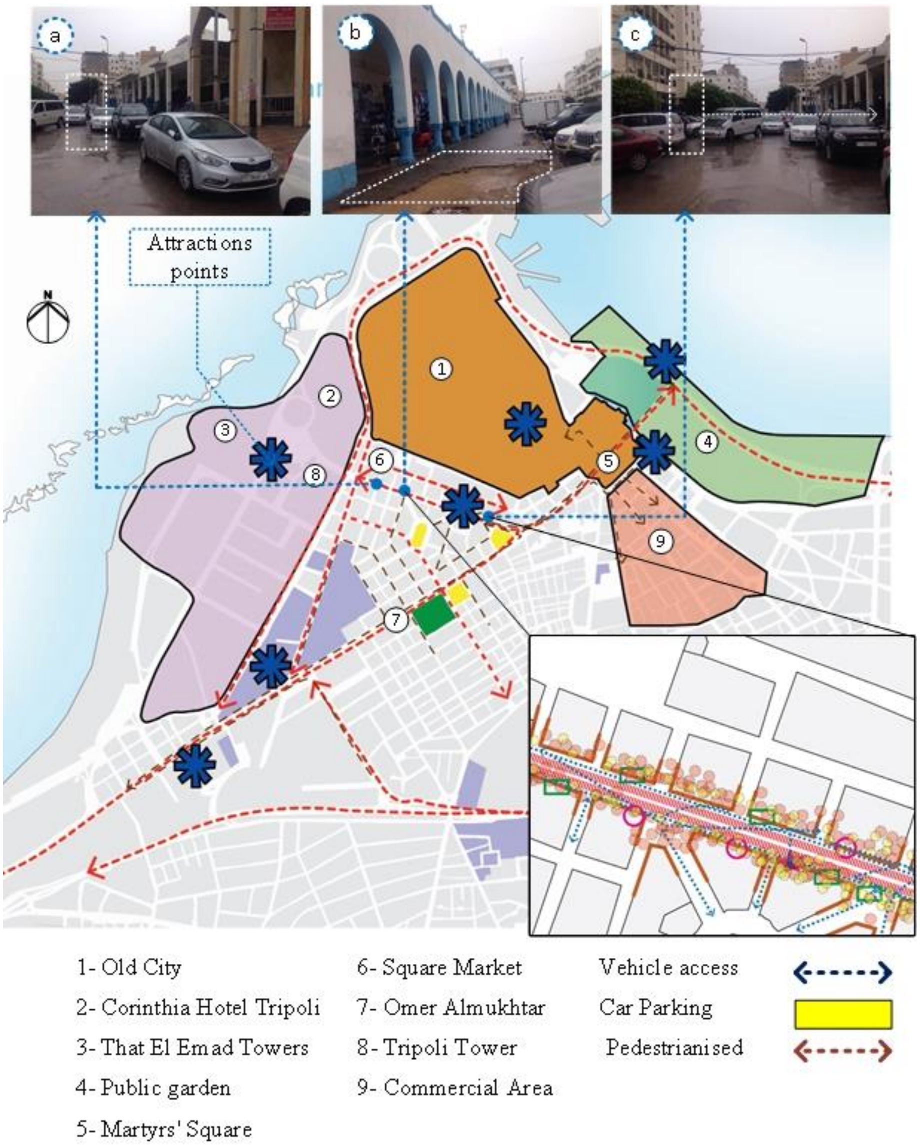


Figure 8-24 Use of attraction points for car parking

Source: Author

As in the other case study sites, the result is traffic jams and obstructions to walking, with drivers occupying pedestrian pavements and streets in general for parking. Figure 8-24 (c) shows that most of the sub-streets around RS are full of vendors, which further obstructs pedestrians, and pavements are effectively none-existent, along with car parking facilities, street signs, and disabled access facilities (Figure 8-24 (b)). Some buildings further prevent walkability by obstructing street flow, such as with stairs outside their doors or height differences between the street and building levels, leaving little or no space for continuous pedestrian movement.

8.4.5 Mixed land use

Saelens and Handy (2008) indicated that mixed land use generally supports walking. Figure 8-25 shows the space and building functions of the surrounding environments within almost 500 meters of RS. As explained in the previous sections, RS contains a collection of historic buildings, whose usage has varied over the time.

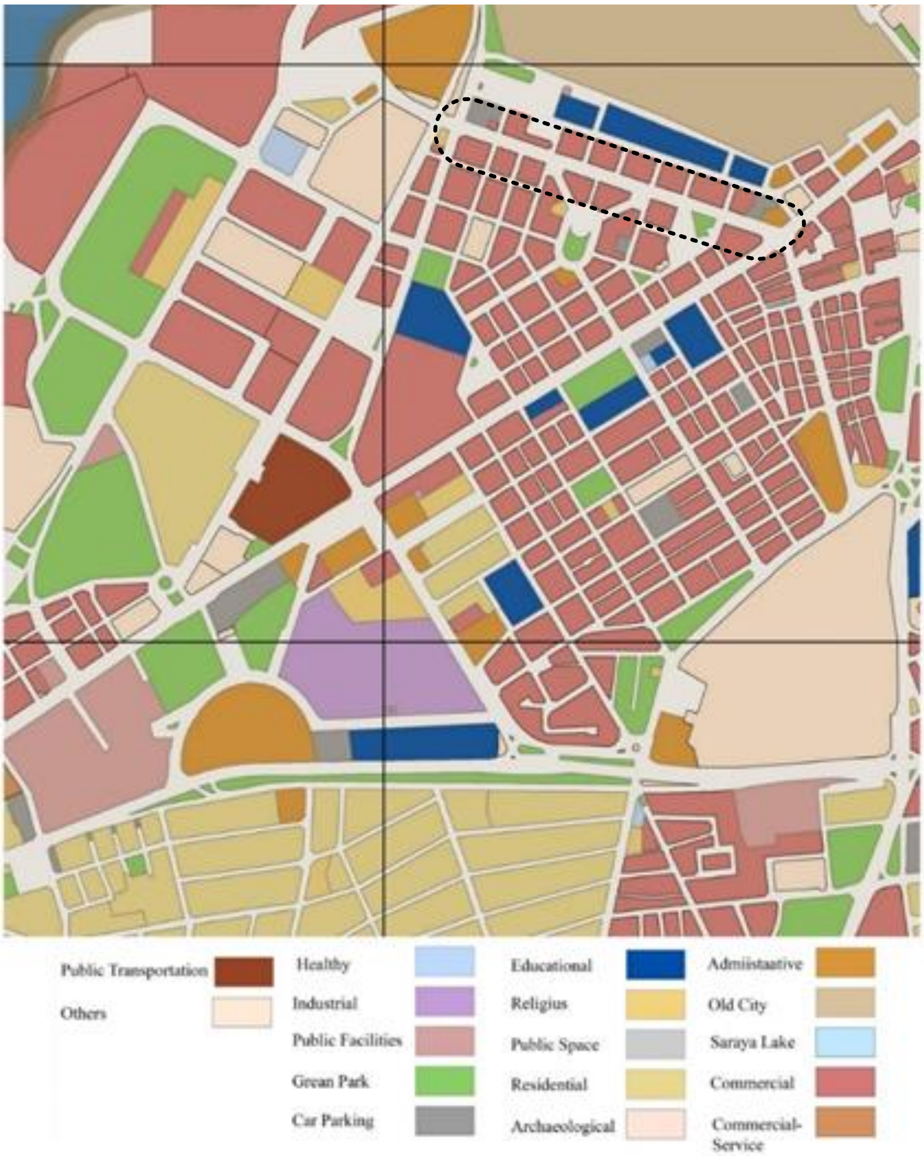


Figure 8-25 Land use around RS

Source: Author

Also, RS includes special buildings built during more recent periods, from the 1950s to recent years, including the Fish Market (Souq Al-Hut). Moreover, much of the ground-floor buildings around RS house shops, and the main activity is the retail trade. The observation noted the lack of car parking facilities. Most of the shops in this area are open during the day and closed at night.

8.4.6 Place aesthetics

Good POS aesthetics are associated with higher levels of walkability (Brownson et al., 2009). RS was chosen as high walkable open space with poor environment condition.

Furthermore, RS is well known for its historical significance as one the earliest traditional shopping streets in Tripoli. Figure 8-26 shows the Fish Market (Souq Al-Hut), the first market built in Tripoli following the Italian occupation. Almost 65% of the total number of buildings located in RS are in poor condition, and no maintenance has been undertaken on them for a long time. Landscape items such as trees and street lighting are essential elements of walkable spaces, and they are deficient in RS. Likewise, roads and pavements around the Street are in poor condition.

Figure 8-26 The Fish Market (Souq Al-Hut), Al-Rasheed Street

Source: Author

8.4.7 Safety and security

The poor safety and security profile of Tripoli has been explained in detail previously. Because RS is one of the most crowded streets in Tripoli, it is generally characterised by feeling more safe and secure than other areas in terms of violent crime. However, in terms of pedestrian safety, observation shows that on-street parking and vendors occupy most of the pavement on both sides of the street. Figure 8-27 shows that the users have to share the pathway spaces with the vehicles and/or walk in the middle of the street. It was observed that there is a lack of police presence, with no policemen being observed in the street despite it being a busy area. Furthermore, the observation noted a lack of lighting at night in RS, due to power outages for long hours or the lack of regular maintenance of the street lights, which gives users a sense of insecurity at night.

Figure 8-27 Pathways blocked to users by vehicles

Source: Author

8.4.8 Convenience and comfort

According to Sarkar (2002), comfort in walkable places refers to the pleasant state of physiological, psychological and physical harmony between the human body and the environment, and the place should facilitate the pedestrian need for comfort. The observation revealed poor convenience and comfort factors in RS. Figure 8-28 shows pedestrian pathways used for car parking, which makes walking around RS very difficult. Furthermore, Zakaria and Ujang (2014) illustrated that the attractiveness of the place and quality of the streetscape influences people's perception on the distance travelled and their willingness to walk; in this context, relative to the observation, there is a clear lack of landscape, with the street full of rubbish and no litter bins. As in the other sites, there are no public toilets in RS, which makes the walk in RS uncomfortable. Moreover, there are many pedestrian barriers such as trees growing in the pathway, no pedestrian crosswalk, and no traffic lights. Additionally, there is no street lighting, no sites of interest (other than shops), and no shelters for pedestrians to rest, which makes walking in RS very difficult.

Figure 8-28 Pedestrian pathway used for car parking and garbage

Source: Author

8.5 Summary

8.5.1 Weekends

The observation method in the four case study areas over two days each (weekdays and weekends) and four sessions (morning, afternoon, evening, and night time) has illustrated that users of the four case study areas are similar to their counterparts worldwide in terms of their use of POS for standing, walking, sitting, and eating at various times of the day, if safety, security, and weather permit, but they are hampered by numerous barriers to walkability. Figure 8-29 shows the number of users in the four case study areas at the weekend. The highest number was 3148 people (RS), while the lowest was 910 (OMS).

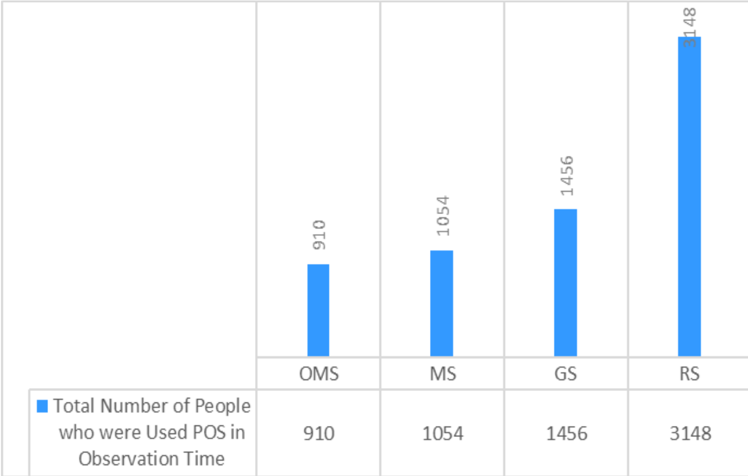


Figure 8-29 Number of users in the four case study areas in weekend time

Source: Author

Through direct observation, Figure 8-30 shows the there was no significant difference between the four case study areas in term of POS visiting time, as the highest numbers were recorded in the evening (18:00-18:15) in all of the four case study areas. This is because most people are not working during this time, and the weather conditions are better (i.e. cooler) in the evening. Reflecting this latent preference, most shops in RS opened after 16:00.

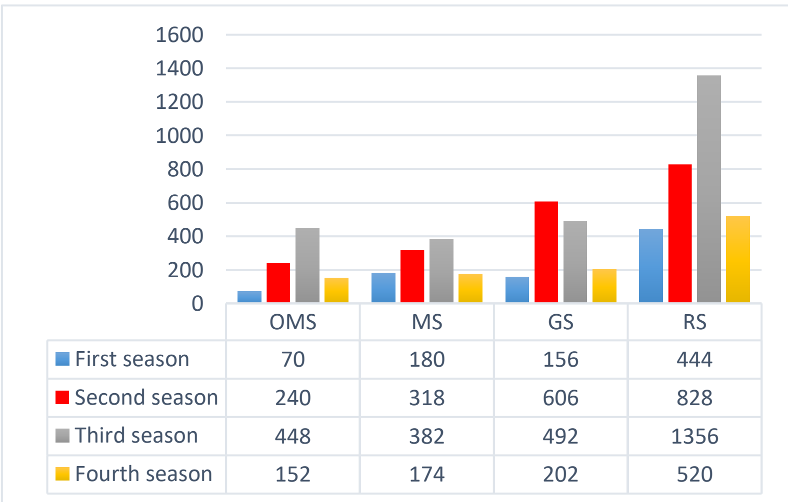
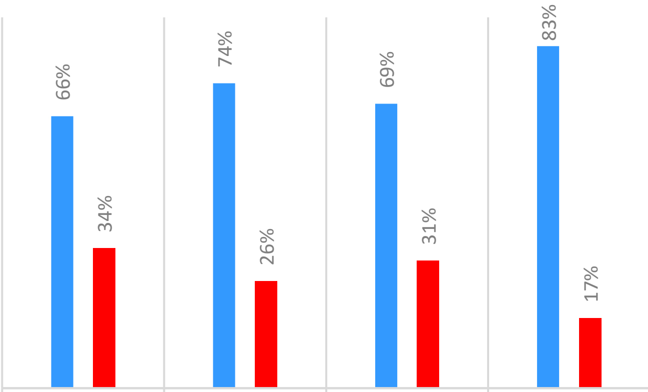


Figure 8-30 Difference between four case study areas in POS visiting time

Source: Author

The number of people visiting the four case study areas was noticeably skewed in favour of males. Figure 8-31 shows that the presence of men in the four case study areas is more than that of women, although women were observed participating in almost all activities except sitting in the streets, which is not part of Libyan culture, and because of the safety and security situation. Also, the main activities of the women were the shopping and walking.



	OMS	MS	GS	RS
Male	66%	74%	69%	83%
Female	34%	26%	31%	17%

Figure 8-31 Number the POS users by gender

Source: Author

Figure 8-32 shows that the number of vehicles around MS was 4830, which was the highest number in all four case study areas, because MS is located in the centre of Tripoli and it is surrounding by multiple buildings and activities, while the lowest number was recorded in OMS, which also had the lowest number of vehicles.

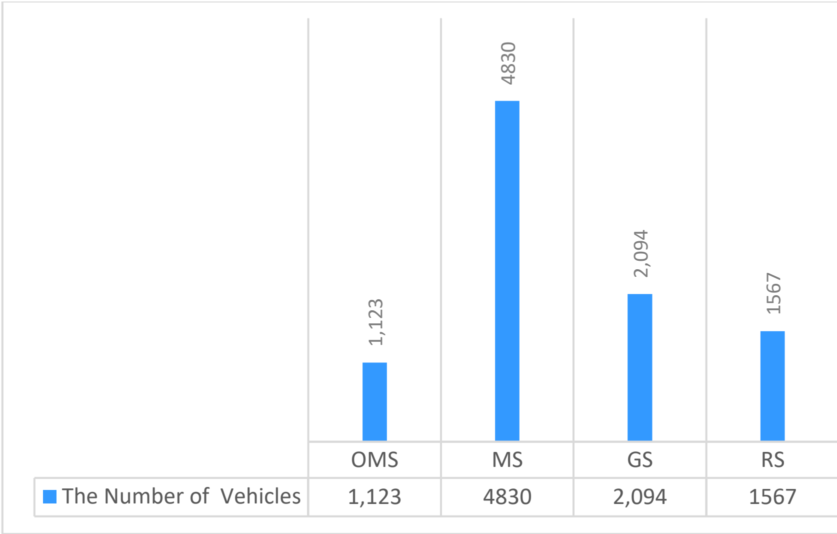


Figure 8-32 Number of vehicles around case study areas

Source: Author

8.5.2 Weekdays

Figure 8-33 shows the number of users in the four case study areas on weekdays. Moreover, the highest number was 3712 people, recorded in RS, and the lowest was 910, recorded in OMS. Also, this shows that there are significant differences in the number of the users in the four case study areas.

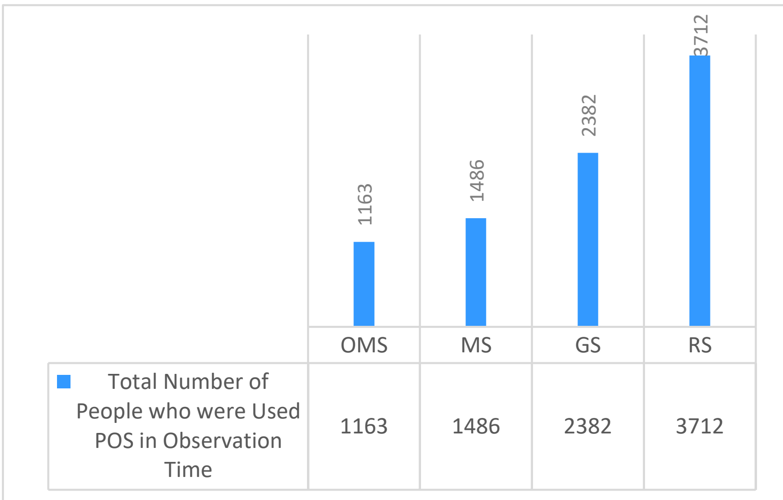
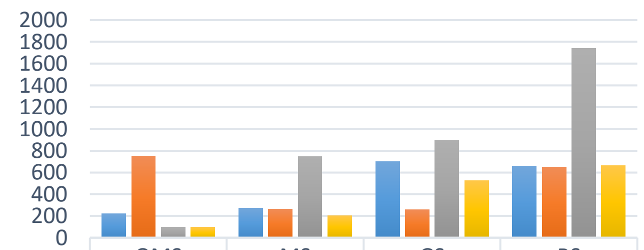


Figure 8-33 Number of users in the four case study areas on weekdays

Source: Author

Figure 8-34 illustrates that the busiest time in three of the case studies (MS, AS, and RS) was the evening, while in OMS the afternoon was the busiest. The observation showed that commercial areas had high walking intentions, while POS with other different activities, such as sitting, walking, and sport etc. were related to low walking intentions.



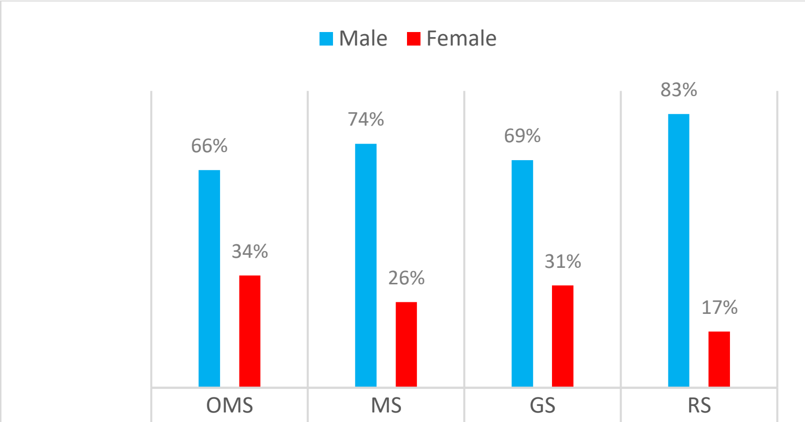
	OMS	MS	GS	RS
First session	221	270	700	660
Second session	750	264	258	648
Third session	96	748	900	1740
Fourth session	96	204	524	664

First session Second session Third session Fourth session

Figure 8-34 Number of users in different sessions

Source: Author

Figure 8-35 shows that across the four cases only a few women were observed walking compared to men. The reasons why women walked less than men in the four case studies area were connected with the safety condition in Libya. The finding is consistent with the results of previous studies, which concluded that perceived safety is an element that can affect preferences for natural environments, and prevent restoration in green spaces (Andrews and Gatersleben, 2010; Gatersleben and Andrews, 2013).



	OMS	MS	GS	RS
Male	66%	74%	69%	83%
Female	34%	26%	31%	17%

Figure 8-35 Number of users by gender

Source: Author

Figure 8-36 shows that the number of vehicles around MS was 7711, which was the highest number in all four case study areas, which is because MS located in the centre of Tripoli and is surrounded by multi buildings and activities, while the lowest number was recorded in OMS, and the lowest number of vehicles was recorded in OMS.

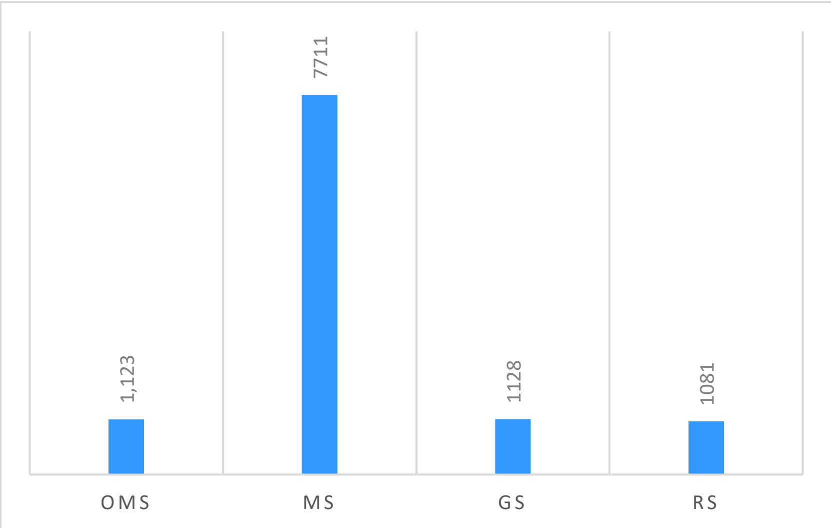


Figure 8-36 Number of vehicles around case study areas

Source: Author

This chapter explored the four case study areas (OMS, MS, AS, and RS) to explore whether the distinctive characteristics of Libyan public spaces play roles in shaping the walkable environment, and whether walking and mobility behaviours differ according to cultural behaviour. The chapter started by defining the walkability factors in the case studies, introducing the sites and the types of place and activities they offer for users weekends and weekdays. It analysed their accessibility, condition of pedestrian facilities, type of mixed land use, place aesthetics, safety and security, and convenience & comfort. The following are the salient findings from this chapter:

- Most people prefer using vehicles instead of walking.
- There is a lack of public transportation in the four case study areas.
- Pedestrians used the case study areas at specified times and chose crowed places.
- There is a lack of activities diversity, and most activities are commercial (i.e. shopping).
- There is a lack of dedicated parking spaces and blockage of walkways.
- Lack of car parking causes streets and pavements to be used for car parking and informal vending activities.
- There is a lack of comfortable elements such as outdoor seating, shelter, and street furniture.
- There is a lack of pedestrian safety elements, such as crosswalks, traffic lights, and traffic signs. There is a lack of disabled facilities and children's playground facilities.
- Finally, there is a lack of reliable street lighting.

Chapter 9

Phase 2: Focus Group Discussion Results & Analysis

Krueger (1994) explained that FGD is a useful method for probing the meaning of human perception and behaviour, especially when an issue has not been previously explored in great depth. The professionals in the field of urban planning and urban design, such as architects, landscape architects, town planners, and academics, due to their experience, education level, POS management and design, have a deep understanding of the issues concerning various aspects of the walkability in POS. For this reason, the intention of this chapter was to presents results from the focus group analysis, carried out in **13 February -05 April 2018.** As stated in Chapter 3, the method was used primarily to validate and strengthen evidence the findings gathered from a questionnaire survey. The chapter explores barriers affecting walkability in Tripoli's POS, success factors, and strategies and policy prescriptions.

9.1 Focus group discussions

The qualitative methods of focus groups were adopted to formulate a more in-depth analysis by involving many government officials and users to understand their experiences about walkability, barriers limiting walkability in POS, and factors encouraging people to walk in POS. The objectives of the FGD were as outlined earlier. The FGD session was based on three tasks:

- To define and explain the barrier and success factors of walkability in LPOS.
- To provide a relaxed and semi-formal atmosphere that encouraged participants to discuss exhaustively all aspects of walkability in Tripoli.
- To update the research outcome and strategies after validation by the focus group participants.

The latter point was recommended by Hsu, Chang, and Lee (2013) in order to validate guidelines or tools. In addition, the validation technique is a key part of the research results n terms of the theoretical and policy development process; it increases confidence in the research outcomes and makes the research findings more valuable (Kennedy et al., 2005). The areas of expertise of participants in this study's FGD are shown in Table 9.1 Figure 9-1 shows the first FGD session.

FGD participants were invited to participate by sending a formal invitation letter and subsequently a telephone confirmation of attendance when requested by participants. The focus group in this study involved 15 participants in two (8 and 7) FGD sessions, all of whom have some experience related to data walkability and POS in Tripoli.

The sessions, facilitated by the author, started with a general introduction, and a small exercise was conducted to determine participants' levels of understanding of the subject. The each participant was given A4 papers, pencils, pens, highlighters, and removable stickers. In the exercise participants were requested to answer three questions (Appendix 7):

What do you know about walkable public open spaces?

How walkable is The Tripoli city?

what is list identified barriers that limited walking in Tripoli Libya?

what is list identified success factors that can make Tripoli walkable city?

During the introductory discussions, participants in each session were divided into two groups of discussants, ensuring that people who might know each other were separated. The session was recorded by audio as well as video means for subsequent transcription. These exercises were completed and collected, and feedback to the full group was recorded on flip charts.

The data gathered from the flip charts, transcripts, and handouts through the two sessions were then synthesised to provide an overall position of the entire focus groups on current walkability design, planning, management and maintenance practice in Tripoli. This was with a view to prescribing strategies and policy options for adapting global best practices to suit local conditions. Appendix 7 presents a copy of an invitation to participate in the FGD. To facilitate the discussion, the participants were placed in small groups. Each session started by defining the research problem to the focus group participants, identifying barriers and opportunities available, and mentioning prescribed strategies derived from the literature that could be adapted in Tripoli's POS to make the city more walkable.

Table 9.1 Participants' expertise

Group A	Group B
• Government agencies and Tripoli local authorities • Architects (Municipality of Tripoli Centre) • Urban planning engineers (Organization for Development of Administrative Centres) • Private sector • Private sector (Architect) • Private sector • Local offices urban planning (city of Tripoli) • User of public open spaces in Tripoli	• Government agencies and Tripoli local authorities • Representative of Libyan Parliament • Local communities of Tripoli city centre • Local offices urban planning (city of Tripoli) • Private sector • Architect (National Libyan Consulting Office) • User of public open spaces in Tripoli

Source: Author

Figure 9-1 Session 2 focus group discussion

Source: Author

9.2 Barriers affecting walkability in Tripoli’s POS

Figure 9-2 is a diagrammatic representation of the main barriers limiting walkability in the City’s POS, as summed up by the FGD. Generally, the barriers fall into five main categories: safety and security, facility/ physical, social/ cultural, accessibility, and institutional/ management/ financial barriers, as explained below.

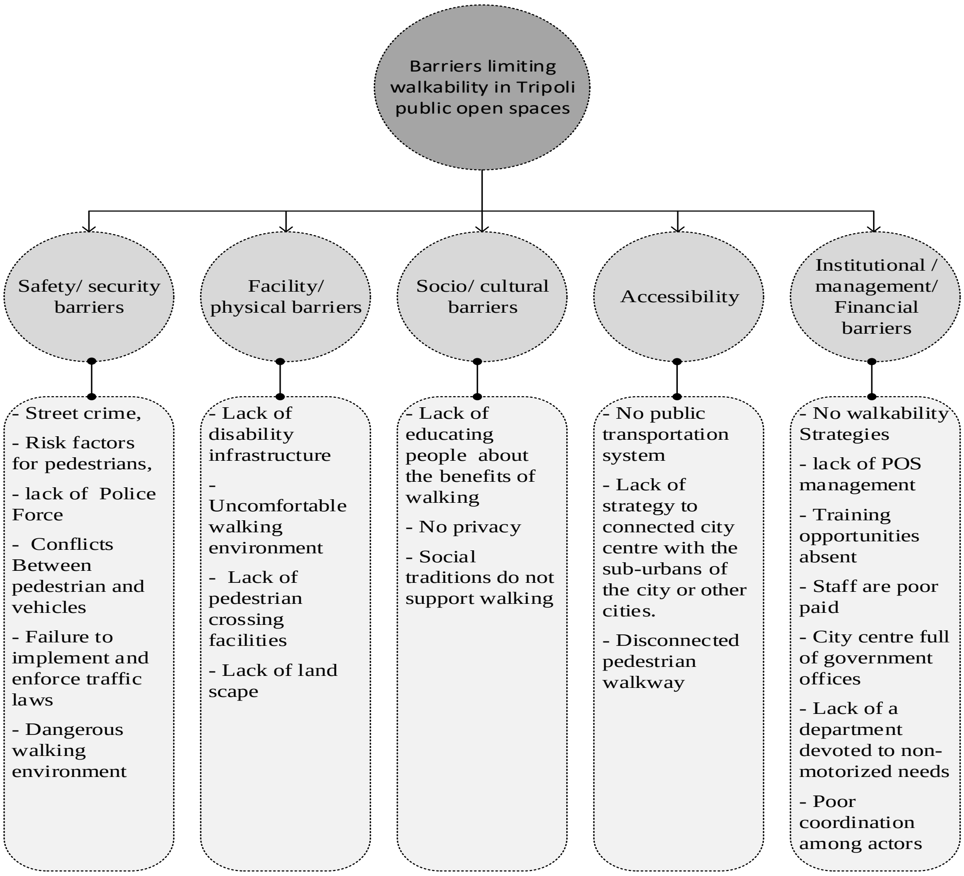


Figure 9-2 Main barriers limiting walkability in POS

Source: Author

9.2.1 Safety and security barriers

Graeme Evans (2009) argued that safety and security are often regarded as the uppermost constraining factors to walking in modern cities, especially by vulnerable groups and those who rely more on walking. Safety and security realities in Tripoli constitute a significant block of barriers affecting walkability in POS. Nowadays the crime rate in Libya is high, as NUMBEO (2018), and explained in depth in previous chapters. Social safety and security were addressed in the FGD as major barriers limiting walkability in Tripoli. This result was consistent with the results of the questionnaire survey in sections 6.1.10.1 and 6.1.10.2: safety and security barriers have a strong relationship with the time spent walking in POS and revisiting POS. For example, the absence of the police patrols after 8:00 pm in Tripoli city centre provides opportunities for criminals to go out into the streets, as expressed in the FGD:

> The problem is that the patrols of the police are filling Tripoli in the daytime, which is causing the traffic jams everywhere, while at night, after 8:00 pm, all of them begin to disappear, because of the criminals, as they prepare to start their operations after this time, and this prevents people from using the POS (Private sector, FGD-GA-P6, 15/05/2018).

Improving Libya's safety and security is not an easy mission, and will take years of dedicated real effort if Libya's government seriously wishes the country to become safe and secure again. At the current juncture, and during this study's fieldwork, the government was in partnerships with militias governing large parts of Libya and regions of Tripoli itself, which are very problematic for urban planning due to the lack of effective municipal governance (of the type seen in developed and indeed developing countries not in post-conflict configurations). Numerous FGD participants alluded to the lack of effectiveness of the police and the army:

> The police will not work in a country controlled by militias, and the police will be able to take their prestige just if they disband all Libyan militias (Government agencies and Tripoli local authorities, FGD-GB-P1, 15/05/2018).

> States should make comprehensive efforts to ensure that they are not supporting or encouraging vigilante killings in any way, either directly or indirectly (FGD-GA-P7, 15/05/2018).

The FGD pointed out that lack of safety and security facilities, such as street lights, CCTV, and crossing lights etc. have negative impacts on POS users:

> I believe that the main causes of pedestrians and traffic accidents are associated with speeding, mechanical failures, lack of caution on the part of pedestrians, poorly maintained road surfaces and the lack of signs and

> signals, among other things (Architect (National Libyan Consulting Office), FGD-GB-P6, 22/05/2018).

9.2.2 Facility and physical barriers

The design of the built environment greatly affects people’s desire to walk in POS. Furthermore, demand for pedestrian facilities and good environmental and physical conditions increasing the revisiting of POS and the POS walking duration. Conversely, the existence of physical barriers hinders the possibility of walking and revisiting POS, with declined functional capacity of using POS. Ewing and Handy (2009) argued that a lack of certain facilities deters physical activity (i.e. walking) and makes mobility difficult. There was consensus among participants that the lack of pedestrian infrastructure and poor physical condition in Libyan cities’ POS are some of the main barriers limiting users to re-visit and

Some participants had experienced particular difficulties due to the lack of transport and other facilities necessary to conduct walking and experience walkability in Tripoli:

> In my opinion, quality pedestrian facilities such as pedestrian crossings, pedestrian crossings light, safe walkway from traffic, and street furniture (such as trees for shadow, please for seating, shelters) are necessary for all people, including women, the elderly, people with disabilities, and children, in order to have walkable public open spaces. walking is very famous in Tripoli, I have some friends not just from Tripoli but from other cities, when we meet they ask to visit the pleases where they can walk, not once but every time we meet, but due to the lack of public open spaces and pedestrian facilities we every time go to coffee shops or restaurants to seat and talk (Users of public open spaces in Tripoli FGD-GB-P7, 22/05/2018).

The participants agreed that the lack of parking spaces in the city centre exacerbated walkability barriers, in addition to being a barrier to accessing the city centre in itself. Parking-related problems were mentioned to be particularly acute in Algeria Square and

Martyrs' Square, where the pavements are used for parking, making pedestrian movement very difficult:

> Is it possible that the pedestrians in some places on the street are forced to walk in the street?!! And it is because of the lack of walkways, and also the pavement is occupied by cars and shops, such as in Al Rashid Street (Civil engineer, FGD-GA-P4, 15/05/2018).

The following participant adumbrated the barriers to access posed to his disabled father, which is also considered an aspects of walkability in city centres:

> Since my father started using his wheelchair, some buildings do not have any access for people in wheelchairs. The public buildings and the city in general is have lack of disabled facilities. He cannot move independently; the roads in Tripoli are inaccessible… In my opinion, there needs to be policies and practices that encourage Tripoli's Municipal Council to implement disabled facilities (User of public open spaces in Tripoli, FGD-GA-P8, 15/05/2018).

9.2.3 Socio-cultural barriers

Rapid urbanisation and population growth in Tripoli hamper sustainable development and have created a car-dependent culture. Car-dependent cultures require significant land use for roadways and parking spaces, which is not available in Tripoli city centre (Abdulla et al., 2016). Hamdan-Saliba and Fenster (2012) argued that it is often assumed that in Middle Eastern countries access to space is clearly defined: POS are for men while women are relegated to the private sphere. Moreover, one of the focus group discussants opined that women are significantly less walk than men in Libya because of socio-cultural reasons, and the same FDG attributed the lack of an active lifestyle to socio-cultural factors, including barriers that impede people from walking in the city centre, as noted by the following participants:

> In Tripoli, a car is a essential for Libyan daily life, and city design gives priority to the cars, also walking to do daily activities can be interpreted from the Libyan community as an action done by poor people. I think the Libyan society needs to be educated about the benefits of walking… people are not really educated on how the urban city and daily environment should be (Local offices urban planning (City of Tripoli), FGD-GB-P4, 22/05/2018).

> When I walk in Tripoli streets and encounter a friend driving his car… he will stop his car and insist on taking you with him… and in my opinion it is one of the socio-cultural barriers (Local communities of Tripoli city centre), FGD-GB-P3, 22/05/2018).

Libyan people do not know about their rights to use public open spaces, particularly women, who are restricted by societal conventions, as noted in the observation section (women were seen in the four case study areas during working hours, while men could be seen at all observation times). Participants reflected on cultural factors in the following extracts:

> The users in the Western countries have earned the their right to use the POS and learnt respect regarding these notions, and had an evolution of increased awareness, whereas in Libya generally, and in Tripoli particularly we didn't have this self-earning. Therefore, we don't have a similar awareness… I think people needed to be educated about their right to use the public open spaces (Local offices urban planning (city of Tripoli), FGD-GB-P8, 22/05/2018).

> The Open Public open spaces in Tripoli are only maintained and cleaned by the Municipality of Tripoli. Also… the Libyan people are the most negative people. I have seen it before, directly after the Municipality cleans, the POS users started to throw garbage on the ground. I am a volunteer unit for the cleanliness of Tripoli. I used to go for cleaning, I have seen a father with his family, he threw garbage on the ground in front of his children. He gave this

> negative attitude to them. Most Libyan people have travelled to Tunisia or to Jordan and they respected the countries they travel to, they respect traffic signs and abode by the law, but when they retreat to Libya they return to how they were before (Government agencies and Tripoli local authorities, FGD-GB-P1, 22/05/2018).

9.2.4 Accessibility barriers

Accessibility is a measure of providing access to and use of facilities, amenities, public transport and services (Burton & Mitchell, 2006; Ewing & Handy, 2009). Libyan cities today lack coherence, harmony, infrastructure, and public transportation systems, leading to confusion in city centre functions. The lack of accessibility in Tripoli was explored in FGD as one of the barriers that limited pedestrians' access and ability to walk in Tripoli city centre, and participants blamed the local authorities for the negative impact of public transportation on walkability. Urban planning designers and the Libyan planning design standards to which they are subject prioritise the movement of vehicles over people.

> In my understanding of accessibility, it is how much easy to get into please you want to go… nowadays, Tripoli has no public transportation, and it is full of cars… We need to improve accessibility to daily needs by providing public transportation (Architects (Municipality of Tripoli Centre), FGD-GA-P2, 15/05/2018).

> Overall, people attractive to public open spaces have facilities such as accessibility and providing enough parking lots, and maintenance… also… the POS facilities, such as accessibility, affect some other factors, like which POS people like to go to and how long time people love to spend in each… ease of access is attractive, for more people to use (Government agencies and Tripoli local authorities, FGD-GA-P1, 15/05/2018).

9.2.5 Institutional, management, and financial barriers

In most developing countries the management of public spaces, streets, squares, parks, playgrounds, and other freely accessible areas are normally administered by public sector authorities. Shaftoe (2008) argued that managing a POS is not just about making it safe and secure; in fact, good management should make a POS proactive, encourage interesting activities, and provide a variety of reasons for people's gathering and lingering in POS. Participants agreed that Libyan cities are not walkable because of the conflict and instability in Libya since 2011, and also due to the lack of clarity of competence and overlapping disciplines among Libyan institutions. They also cited a lack of financial support, ineffective management, and the spread of financial corruption in Libyan state institutions as inhibitors of effective maintenance and management of POS. Also, the policy gap was also observed in the FGD, including that currently there are no planning guidelines on where to locate public facilities; instead, spatial planners decide on their own, based on site characteristics. The following statements clearly show how the participants concur with the institutional, management, and financial barriers in Tripoli's POSs:

> Nowadays, Libya has a lot of departments that have one thing or the other to do with the public open spaces… There is no specific strategy to create new public open spaces and/ or to manage and maintain the existing ones… also, poor coordination among actors is one of the main issues in Libya nowadays (Local communities of Tripoli city centre, FGD-GB-P3, 22/05/2018).

> For me, in this time the main barrier in Libya is the corruption… the corruption is pervasive throughout line ministries and Government departments… and it is a barrier to maintenance, and creating more attractive activities in Tripoli's POSs (Private sector, FGD-GA-P6, 15/05/2018).

On the issue of pedestrian infrastructure, experts highlighted the importance of enhancing the pedestrian pathway, street signs, and improving pedestrian infrastructure, stressing the imperative for local authorities to take the lead in this.

> When I walk down here from Al Rashid Street there are a few pathways that are in poor condition, and in the same locations they are blocked by cars or goods outside the shops… I think these inabilities are all because of a lawlessness culture, and the lack of money in Tripoli Municipality (User of public open spaces in Tripoli, FGD-GA-P7, 22/05/2018).

Currently, the absence of professional and well-trained staff to design and manage POS was viewed as the underlying reason for the particular barriers facing the design and management of POS in Tripoli.

9.3 Overview of success factors affecting walkability

Figure 9-3 shows the diagrammatic representation of the success factors affecting walkability in Tripoli as drawn by the FGD. These factors are divided into five main categories: management, law enforcement and establish a new institution to manage the POS; multiple major city centres; health, safety, economy and social interactions; walkable facilities and recognition of non-motorized means of transport; public transportation system; and providing different types of activities in POS at different times.

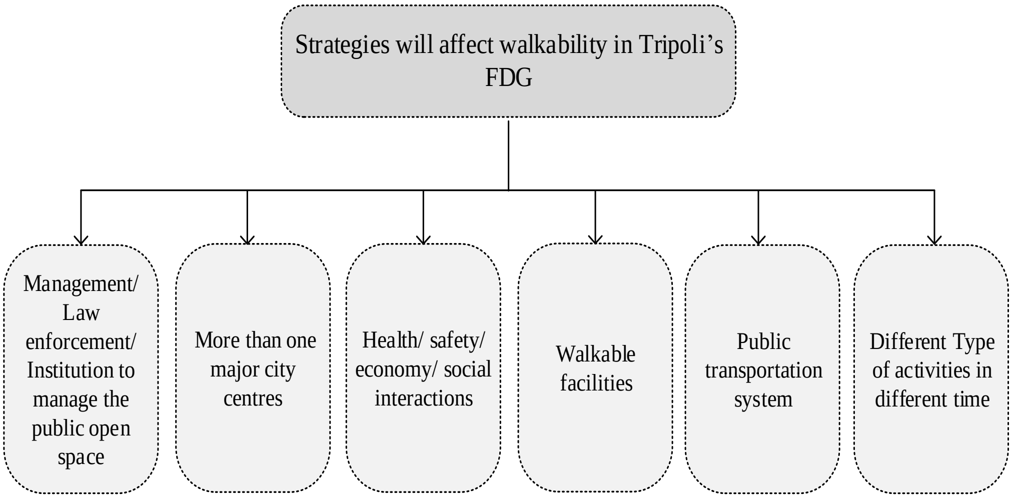


Figure 9-3 Success factors affecting walkability in Tripoli

Source: Author

9.3.1 Management, law enforcement, a new institution to manage POS

Based on the FGD, the managers and designers of Tripoli's POS should enable access regardless of social classes and physical conditions, which they view as a civic responsibility of the local government. Participants argued that managers of POS should enforce stricter rules in excluding offensive groups and people carrying weapons, who might conduct antisocial behaviours. Also, POS management institutions in Tripoli should implement frequent cleaning programs that ensure the provision of salubrious places for the users. The provision and management of POS should strive for more effective, responsive and cost-effective ways of delivering services to encourage people to walk.

> A large number of developing countries have either amended their constitutions or complemented them with national laws defining specific responsibilities for local authorities… in Libya the case is different… central authorities limited the power and speed of local authorities in tacking daily problems… not far from that in Tripoli's POSs management… in my opinion… The central government should give more power for the local authorities to manage and administrate the POSs in Libyan cities (Urban

> planning engineers (Organization for Development of Administrative Centres), FGD-GA-P3, 15/05/2018).

On the other hand, policies and procedures should be formulated such that POS management should be an interactive, collaborative process, between government agencies and the public, emphasising the importance of interpersonal experiences of the community with the POS. W-POS development and management decisions require consideration of the recreational activities that arouse feelings of personal relevance and attachment. Participant indicated that Tripoli's POS are currently managed by overlapping institutions, including the Libyan National Park Management and Development Authority, Libyan Commission for Tourism, Ministry of Housing and Utilities, Municipality of Tripoli, Development of Administrative Centres Device, and Tripoli Public Services Company; consequently, to optimally deploy resources and avoid confusion, they recommended establishing a new institution to manage POS.

> Establishing a new institution to manage POS could help… and also long period and short period planning and strategies for Tripoli's POSs could help to create W-POS… It even could change the behavioural patterns (Government agencies and Tripoli local authorities, FGD-GA-P3, 22/05/2018).

9.3.2 Multiple major city centres

The city centre is the heart and most essential part of a city. Tripoli has been rapidly growing, and its population has tripled in less than 20 years, from 0.5 million in 1993 to 1.5 million in 2013 (Bureau of Statistics and Census-Libya, 2010). On the other hand, most of the government institutions are concentrated in Tripoli city centre, causing many problems including traffic congestion, pollution, and the occupation of walkways by motorised vehicles. The FGD noted this large and rapidly growing population, and the over-centralization of institutions in Tripoli, and suggested that given Tripoli's vast desert hinterland and modern transport possibilities, it is possible to diffuse the urban concentration by building new radial centres around Tripoli for government institutions, thus reducing traffic congestion in the centre of the city of Tripoli and offering a chance to gentrify and upgrade the traditional urban infrastructure and POS, particularly sites of historical and social interest (e.g. the case study sites).

> In Tripoli city centre, the big number of cars in the city's streets and the congestion has reduced average speeds drastically on major roads, resulting in substantial increases in emissions, in the city centre… and that is due to the government offices being located in Tripoli city centre… to make Tripoli's streets free of cars, or have less cars, the ministries and government offices should be moved outside Tripoli centre (Private sector, FGD-GA-P6, 15/05/2018).

9.3.3 Walkability is health, safety, economy and social interactions

Only 25% of Libyans walk regularly as a form of transport (WHO, 2015, p. 11). Walking has excellent potential to contribute to the higher levels of health, economic, social, safety and security benefits, which is why people in developed countries look to walking as a cultural and personal lifestyle feature. Increasing the knowledge of the walkability benefits in Libyan society could induce people towards more walking in their daily life routines, which would provide a wide range of health and economic benefits for individuals and the country, providing opportunities for social interaction, and increasing safety and security benefits for the Libyan community. The FGD considered this as potentially a significant success factor affecting walkability in the city.

> I believe that… the main task of the local authorities at promote the development and enhancement of public awareness of the benefits of the walking instead of driving a car in improving the quality of life… and that is by focused on media campaign strategies to show the walking benefits for

> people in term of health, safety, economy and social interactions (Architects (Municipality of Tripoli Centre), FGD-GA-P2, 15/05/2018).

9.3.4 Walkable facilities

Tripoli city centre's Architectural and Urban Charter (2010) recognises the lack of pedestrian walkways and other pedestrian facilities in Tripoli area; this was extensively confirmed in the observation of the four case study areas. Furthermore, the FGD participants believed that the investment of local authorities in walkability facilities, such as pedestrian facilities, dishabille facilities, car park facilities, means of comfort (seating areas, public toilets, protection from the weather) would increase the number of walking people in POS.

Therefore, the experts pronounced the need for walkability facilities such as clear pedestrian platforms, kerb crossings, pedestrian zebra crossings, pedestrian signals, grade separation, grates and covers, landscape, street furniture, public transport and public transport interface that make the public open spaces more walkable.

> I agree with the statement saying that… the facilities are one of the most important factors that affect POS users to stay for a long time and re-visit the POS… such as comfortable facilities, safety facilities, transportation facilities (Local offices urban planning (city of Tripoli), FGD-GA-P3, 22/05/2018).

> Libya needs a revolution in reconstruction… we are one of the richest nations in the world… but when you look at our cities' infrastructure… it is very poor in every respect … it not poor just in street furniture… but also in all public services, such as car parking, street lighting, and city landscapes… the Municipality of Tripoli needs a clear strategy and plan to provide all of those facilities… it is a Municipality responsibility (User of public open spaces in Tripoli, FGD-GA-P8, 15/05/2018).

> Libya is an Islamic century… and the Libyan community is a religiously conservative society, and Libyan families, to engage in POSs need to have a privacy… Also, from my experience, places that give priority to single or teenage users will not be used by families… so any future plan or strategy needs to consider this factor (Architect (National Libyan Consulting Office), FGD-GA-P6, 22/05/2018).

9.3.5 Developing the public transportation system

As explained in Chapters 1 and 2, WHO (2008) quantified that Libya has egregious road-related deaths and injuries. Despite the endemic traffic congestion observed in Libya and the lack of parking, people have no effective public transportation options, and the cheapness of fuel further contributes to the preference for private cars. The FGD considered that developing public transportation, particularly introducing clean and cheap options, could potentially be a significant success factor affecting walkability in the city. The need to travel by cars between different parts of the city and the lack of public transportation are other barriers to creating walkable public open spaces in Tripoli city centre. The following sentences quoted from the experts support this:

> We are concerned to provide a modern public transportation system to link the different parts of the city… and to reduce individual car use… Tripoli city centre is supposed to have good public open spaces due to the Libyan national income… but due to corruption and the mismanagement, Tripoli, a capital city, has one of the poorest transportation systems in the world (Government agencies and Tripoli local authorities, FGD-GA-P5, 15/05/2018).

9.3.6 Proved different type of activities in different time

Brown et al. (2009) highlighted that general POS events related to social activities contribute to walking intentions. Observation determined that the most prolific activities in the city centre are commercial activities. Also, one of the focus group discussants noted that Tripoli city centre lacks diversity of activities, and they recommended creating different types of activities, such as sports and entertainment activities, as well as pedestrian areas or car-free days to facilitate street vendors as well as pedestrian users of POS.

> From my point of view… the local administration Tripoli has been unable to provide various activities, such as eating and taking photos; sitting, doing sport, roller skating and dancing; children playing; street performances and vending activity, and street food at different times of morning, afternoon, and evening… which makes Tripoli's public open spaces empty of users (Private sector, FGD-GA-P6, 15/05/2018).

> The local authorities in Tripoli have to legislate, and plan strategies for providing attractive activities… but the financial obstacles prevent implementation (Local communities of Tripoli city centre, FGD-GB-P3, 22/05/2018).

9.3.7 Suggested strategies for walkability in POS

Table 9.2 illustrates the recognised barriers and success factors affecting walkability Tripoli's POS as represented on the strategy flowchart, as well as agreed strategies from the FGD to achieve walkable public spaces.

Table 9.2 Final barriers and success factors affecting walkability in Tripoli's POS

Major Barriers	Solutions
Lack of safety and security	Enforcement of traffic law, penal code and intensification of police patrols, installation of CCTV, disarmament on the streets, more street lights, and improved pedestrian safety measures
Lack of facility and physical elements	Provide users amenities (seating, shelter, public toilets, landscape, street kiosk, and pedestrian crossings etc.), provide disability infrastructure and create pedestrian areas or car-free days in some streets
Socio-cultural inhibitions	Educating people about the benefits of walking, creating a positive walking culture, increasing fuel prices, providing places for all members of society, and providing privacy in POS
Lack of management	The government should train and develop the employees in charge of POS, and users should participate in managing and creating activities in POS, and involving the private sector in the management of public space
Low funds, and available funds are sometimes misused	Providing adequate funding to the management of public open spaces
Overlapping government institutions responsible	Collaboration between different administrations to create walkable POS, establishing a special department to administer POS in liaison with other government institutions and stakeholders
Lack of walkability strategy and policy	Create walkability strategy and policy, and promote the concept of sharing space

Source: Author

9.4 Summary

Since the 1980s and 1990s, the focus group method has become increasingly popular as a qualitative research approach for applied social scientists. Focus groups were an excellent tool in this section to discuss barriers and success factors relating to walkability in Libyan POS from experts' perspectives. Participants in the FGD were able to articulate their views of walkability in the city, and to explain why they hold these views.

Given the small number of participants, the statistical significance of these findings is limited. As a complementary phase, the findings from the focus group were highlighted as being in support of the results from Chapter 5 (i.e. from the user and professional questionnaires). Table 9.2 is a summary of the primary outcomes of the FGD. The following are the main findings:

- The concept of walkable cities is a new concept in Libya. Most of the participants in the FGD expressed their admiration for the idea of walkable cities, and acknowledged it as a solution for a lot of problems in Tripoli and other Libyan cities.
- The multiplicity of state administrations and the overlapping of their specialities creates many administrative and practical issues in all Libyan cities, preventing a coherent and efficient approach to administer POS.
- Engaging users of POS in design and selection the types of activities can have a decisive role to build on local experiences, respond to people's needs, and increase the frequency of visiting the POS and the time spent walking in them.
- In light of the circumstances Libya is going through, it is necessary to find different financial resources for the maintenance and construction of POS to help people in Tripoli to walk in the capital city. Also, aspects of planning should be tailored to address already identified barriers militating against walkability in the city.
- To be able to achieve higher levels of efficiency, corruption must be fought in the Libyan government's administrations, and long-term and coherent planning is necessary that involves the interests of all stakeholders.

Chapter 10

Findings and Discussion

Chapters 5 to 8 have presented a detailed analysis of the data collected from the empirical work carried out in Tripoli. As a consequence of detailed analysis, best practise models for walkability in the case study area have been identified. This chapter elaborates on the findings of the research to explain the dimensions of the findings critically, in order to evaluate the quality of walkability in the city. Also, this chapter further discusses and aggregates the main conclusions of the research results with the aim of arriving at conclusions that will underpin strategies and recommendations prescribed in this chapter.

This research was conceived to investigate empirically factors that impact in Tripoli's POS to be walkable, also to analyse and determine the critical barriers and success factors that influence users to select the POS for a walk and spend a long time, as discussed in the following sections.

10.1 Determining the general factors influencing users' decisions to spend time walking and revisiting the POS in Tripoli

Phase one has been done due to the lack of previous studies addressing the barriers and success factors that affect walkability in Libyan cities. In the first phase, the modified Delphi approach (Dalkey & Helmer, 1963; McKenna, 2000) was adopted to capture and consolidate expert knowledge and opinion about walkability and POS. The validity and the consistency of the 71 factors of walkability identified through the literature review were ascertained by applying the Delphi method. Figure 10-1 shows that 45 refined factors were considered as independent variables that affect the level of walkability regarding streets and public squares of Libyan cities in general, and Tripoli in particular.

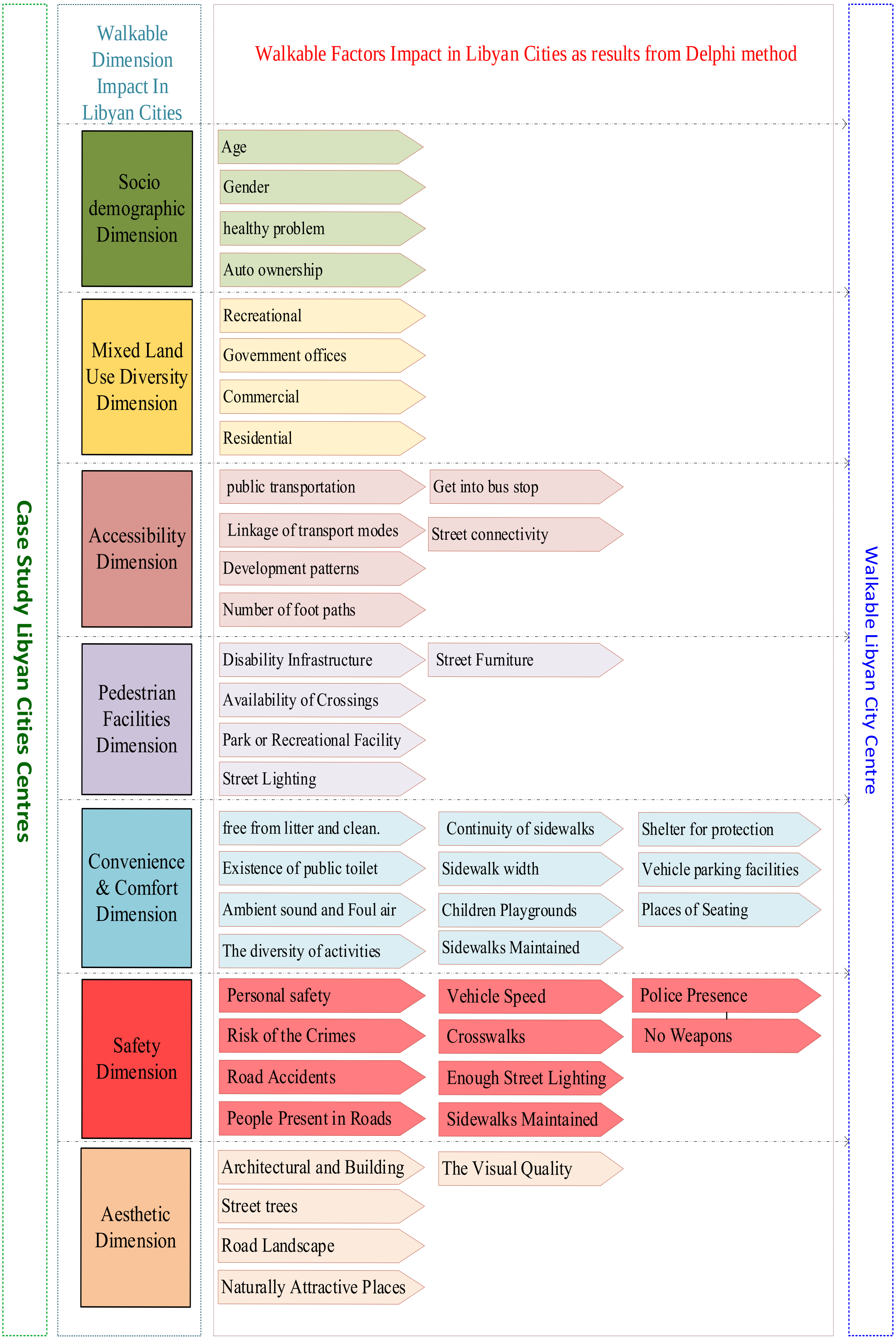


Figure 10-1 Refined factors from Delphi method (n = 45)

Source: Author

On the other hand, the walking with company dimension was rejected by the experts as one of the main walkability dimensions, contrary to the findings of Ball et al. (2011), who found this to be one of the interior walkability dimensions.

10.2 Barriers limiting walkability in Tripoli's POS

This study has classified the main barriers militating against walkability in Tripoli's POS into three main dimensions of participation types (

Figure 10-2 Main barriers to walkability in Tripoli's POS

Source: Author

), comprising

- *Users:* Pedestrian facilities, Safety, Aesthetic.
- *Officials:* Lack of management and administration, Lack of safety and security strategy, Lack of transportation system, Lack of aesthetics, Lack of training and knowledge.
- *FGD:* Safety and security barriers, Facility and physical barriers, Social and cultural barriers, Accessibility barriers, Institutional, management and financial barriers.
- Observation: Pedestrian facilities, Safety, Aesthetic. Activities and management.

Analysing these barriers, overall walkability barriers constraining walkability in Tripoli's POS can be summarised as:

- Safety and security barriers.
- Lack of facilities and physical barriers.
- Institutional, legislative, management and financial barriers.
- Social and cultural barriers.
- Transportation system.

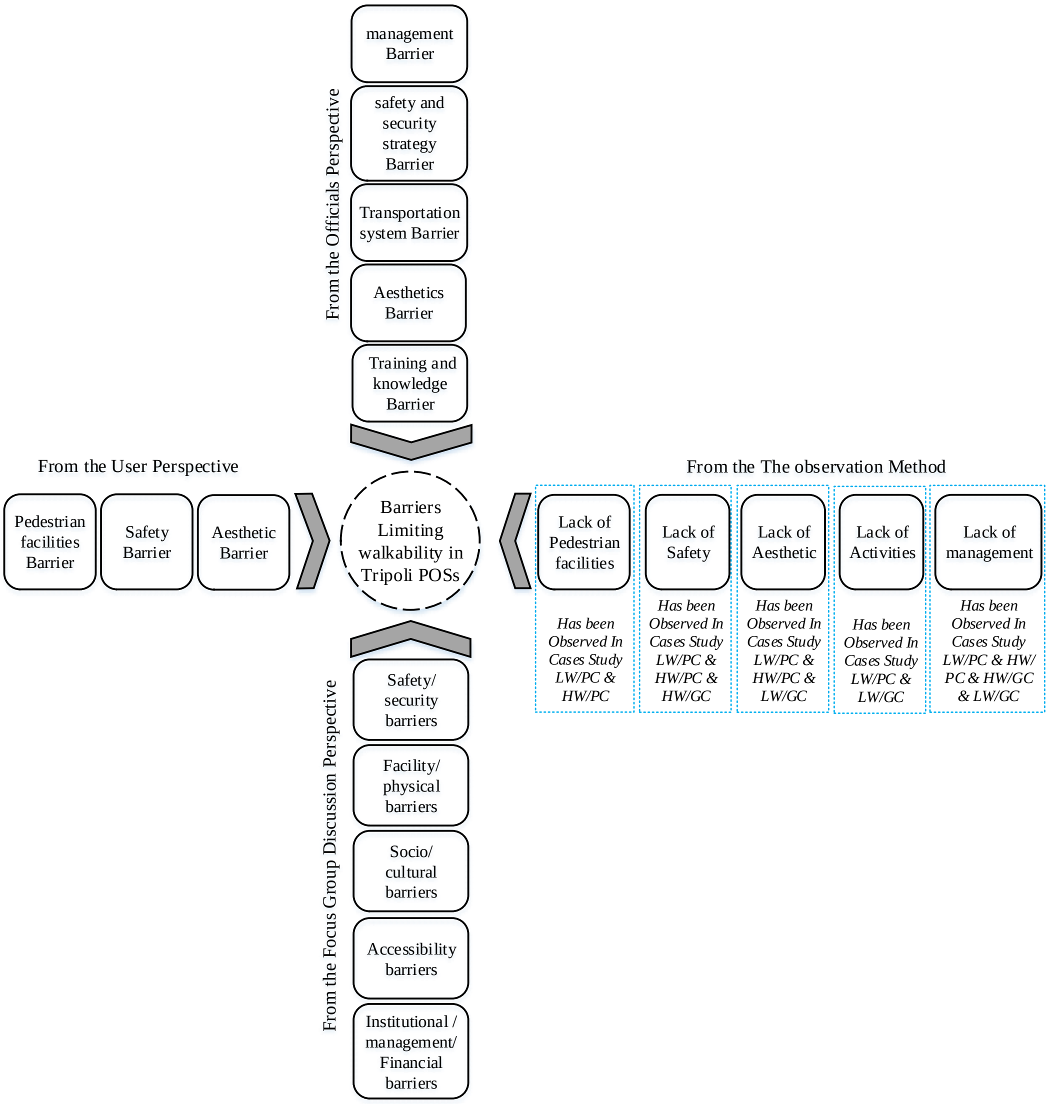


Figure 10-2 Main barriers to walkability in Tripoli's POS

Source: Author

10.2.1 Safety and security barriers

Walkable cities need to invest in infrastructure safety to enhance walkability (Jacob, 1993; Bicycle Federation of America, 1998; Southworth, 2005; Burton & Mitchell, 2006; Montgomery & Roberts, 2008; Giles-Corti et al., 2009; Institute of Transportation Engineers, 2010). UN-Habitat (2011) noted that public safety is a common good that requires the joint effort of different stakeholders including government, municipalities and the community. The findings in line with what Abdulla et al. (2016) stated; in Tripoli, there is a lack of feeling safe among the users of POS, largely due to on-going conflict and instability since 2011.

The findings from the FGD in this study stressed that the political situation in Libya remains fragile and the security situation remains dangerous and unpredictable. Therefore, fighting can break out anywhere without warning, including between local militia groups. Also, the results of the public survey, professional survey, and site observation indicate that the lack of safe pedestrian facilities, interference between traffic and pedestrian in Tripoli city centre and the lack of availability of police on the streets, combined with the spread of crime and absence of respect for the law, prevents people from frequent walking in Tripoli city centre.

10.2.2 Lack of facilities and physical barriers

It is argued that the lack of facilities and physical barriers is believed to negatively influence the decision to walk (Lawrence & Peter, 2000). Also, the lack of certain essential elements in POS, such as physical facilities, negatively affects users, because sociability prospers with the availability of its essential requirements, including physical facilities (Lang, 1994; Gehl, 2010). However, as a capital city, Tripoli confronts essential challenges. It is facing a lack of maintenance of urban design, which has been disregarded by successive Libyan governments, as evident in poor maintenance of open spaces, walking facilities, pedestrian paths and street furniture etc. (Lakhder & Dugeny, 2010). However, the findings from questionnaires and observation methods in the four case study areas showed that Tripoli city centre has lack of pedestrian facilities, such as creating places for sitting, shelters, public toilets, and doing different activities etc. The FGD argued that, due to financial constraints, the walking infrastructure is always eliminated from the main budgets.

10.2.3 Institutional, legislative, management and financial barriers

Results from this research point to the fact that the institutional, legislative, management and financial realities in Tripoli constitute the most critical barriers affecting walkability in

Tripoli's POS. According to Urban Planning Law No. 3 and Act No. 19, the planning activities are divided into four primary levels: National, Regional, Local, and Urban (Libyan-GOV, 2001). Moreover, it can be seen there is no an agency with broader authority and responsibility regarding the management of POS in Tripoli to create soft infrastructure such as events, programs, and activities, unlike for hard infrastructure (e.g. buildings, street design etc.). On the other hand, Mohamed (2013) argued that central planning in Libya can be unaware of the urgency of local issues, and so be a cause of delays and more informal development, and since 2011 most activities of the public sector in Libya have been deeply compromised by unpredictable funding.

10.2.4 Social and cultural barriers

Lawrence and Peter (2000) argued that the personal barriers are subjective considerations that operate on an individual level that inhibit the walking, while environmental barriers are objective conditions that restrict one's walkability. Personal factors such as lack of time, motivation, lack of social support for exercise, and weather, lack of health knowledge, and owning a car may increase or decrease the decision to go on a trip. One of the principal barriers to the adoption of more walkable places in Tripoli is social and cultural barriers. The results from this study point to the fact that the socio-cultural realities in Tripoli constitute one of the most critical barriers affecting walkability in the city. However, the FGD agreed that lifestyles in Libya have increasingly depended on vehicles since the discovery of oil in the country in 1958. Likewise, Libyan society looks at those who do not drive the car as miserly or poor, and the observation method revealed that in some parts of the city centre the continuity of pedestrian walkways in front of shopping venues was occupied by shop owners who had closed the pavements for car parking or commercial use.

10.2.5 Transportation system barriers

Behrens and Watson (1996) stressed that a successful public place is provided with all necessary facilities, activities and public transportation. About 66% of Tripoli's residents prefer to use their cars (Ismail & Elmloshi, 2011). Nowadays the streets are more crowded with own cars, taxis, and different types of vehicles. Within the last 20 years, the continuing growth in vehicle ownership, lack of road spaces, and poor public transport have combined to precipitate various traffic problems in Tripoli's streets (ibid). Approximately two million vehicular movements are recorded in Tripoli every day – a situation that causes traffic congestion on the limited road networks (Abubrig, 2013; Abdulla et al., 2016). Moreover, the finding of this research agrees with Abubrig (2013), who pointed out that public transportation systems in Tripoli (such as train, light rail, metro, and public buses) are missing.

10.3 Evaluation of walkability in Tripoli

Multiple case study research design involves experts proposed four case study areas in Tripoli. These four case studies have presented different aspects of how are the walkability in Tripoli' public open spaces:

- Omar Al-Mokhtar Street, a low walkable open space with poor environment condition (LW/PC).
- Martyrs' Square, a high walkable open space with good environment condition (HW/GC).
- Algeria Square, a low walkable open space with poor environment condition (LW/GC).
- Al-Rasheed Street, a high walkable open space with poor environment condition (HW/PC).

This section assess the walkability dimensions in each of case study areas. The findings in Table 6.1 showed that people do not spend a long time for walking in Tripoli city centre, and almost 40% of the participants in the users' survey preferred to spend 30 minutes or less walking the four case study areas. On the other hand, one of the significant results in this study is that approximately 60% of female participants in the survey preferred to spend 30 minutes to 1 hour or more than 60 minutes, contrary to some previous studies which concluded that men spend more time in POS (James, 2001; Listerborn, 2005). On the other hand, the observation method (Figure 8-31, Figure 8-35) identified that more than 70% of users are male, and the number of the females who used the POS at night was negligible; this partly reflects the conflict in Libya, as well as more long-term social mores (Abdulla et al., 2016). Likewise, approximately 50% of all the participants visit the four case study areas every day or a couple of times a week.

The findings in Figure 8-33 showed that Al-Rasheed Street, categorised in this research as a poor walkable area with high walkability, had the highest number of users during weekdays and weekends. This is attributable (in line with the observation data) to the diversity of the daily activities practiced in this street, such as shopping and working, which are the most critical factors in making people visit and revisit POS in Tripoli city centre. This supports Appleyard's (1987) statement that lively and successful POS can only be achieved with the realisation of a balanced mix of different user groups and activities.

The research finds that users' perspectives of use and walk in POS are affected by their age, and at different age stages their experiences and possibilities to spend time for a walk or re-visit such spaces differ. Approximately 50% of the user participants were aged 18-29 and 30-39 years, and they spent over 60 minutes walking in the four case study areas. On the other hand, about 55% of user participants were aged 40-49, 50- 59 and more than 60 years, and they spend just 30 minutes or less, in line with previous findings (McDowell, 1999; Terlinden, 2003).

The findings of this study showed that studied the education level of the users contributed to the walkability understanding in Tripoli's POS. About 50% of users with elementary or high school education spent 30 minutes or less for a walk in the study areas, while over 40% of users with a bachelor's or postgraduate degree spent more than 60 minutes.

As pointed out previously, the local authorities in Tripoli have no formal walkability strategy for the POS in the city centre, and no government administration for the management of POS, and in general Tripoli is a city of vehicles. Consequently, walkability activities throughout the municipality are almost limited to walking to the work and doing daily activities like shopping. Barriers to walking such as safety, pedestrian facilities, planning and management, aesthetics, and social culture may prevent people from being spend time for walk or revisit Tripoli's POSs. Final Evaluation of walkability in four case study areas have been done in this section.

10.3.1 Walkability evaluation model for Omar Al-Mokhtar Street (low walkable place with poor environment condition)

In this model, the lack of walkability dimensions in OMS is represented as pedestrian facilities, city planning-management, safety and security, and social-cultural interaction. As shown in Figure 10-3, the results confirm that the lack of planning and managing public open spaces in Tripoli city centre has a negative effect on other walkability dimensions; for example because of the lack in the planning and management, pedestrian facilities are in poor condition. The low number of users in OMS also reflects a lack of diversity in activities in OMS; people do not prefer to go spaces devoid of programmed activities.

On the other hand, the model shows that OMS has visually appealing aesthetic resources, such as building façades and the street landscape. Askari (2014) agreed that POS walkability "is in relation to non-visually aesthetic experience while feeling safe, comfortable, and happy are the factors that make a public open space inviting and evocative".

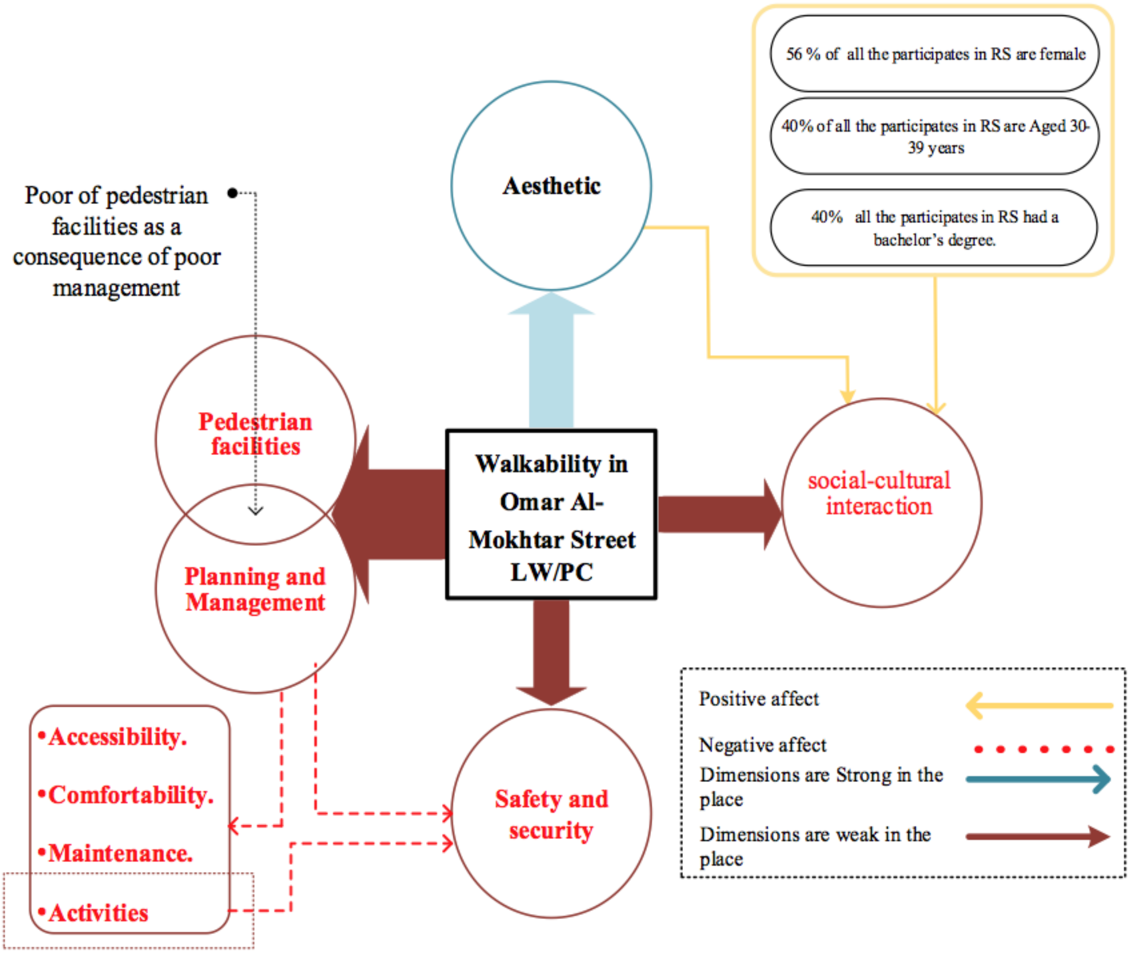


Figure 10-3 Walkability evaluation model in Omar Al-Mokhtar

Source: Author

10.3.2 Walkability evaluation model for Martyrs' Square (high walkable place with good environment condition)

MS is of one the most important public open spaces in Tripoli, located in the heart of the city centre. Figure 10-4 shows the model evaluating walkability in MS. The lack of walkability dimensions in MS is represented as pedestrian facilities, city planning-management, and safety-security. Accessibility, comfortability, and maintenance have a negative relation with city planning and management, while aesthetic, social, and social-cultural interactions have a positive impact on users. Also, the breadth and diversity of activities, albeit limited, is considered as an attractive dimension for users walking in and revisiting MS.

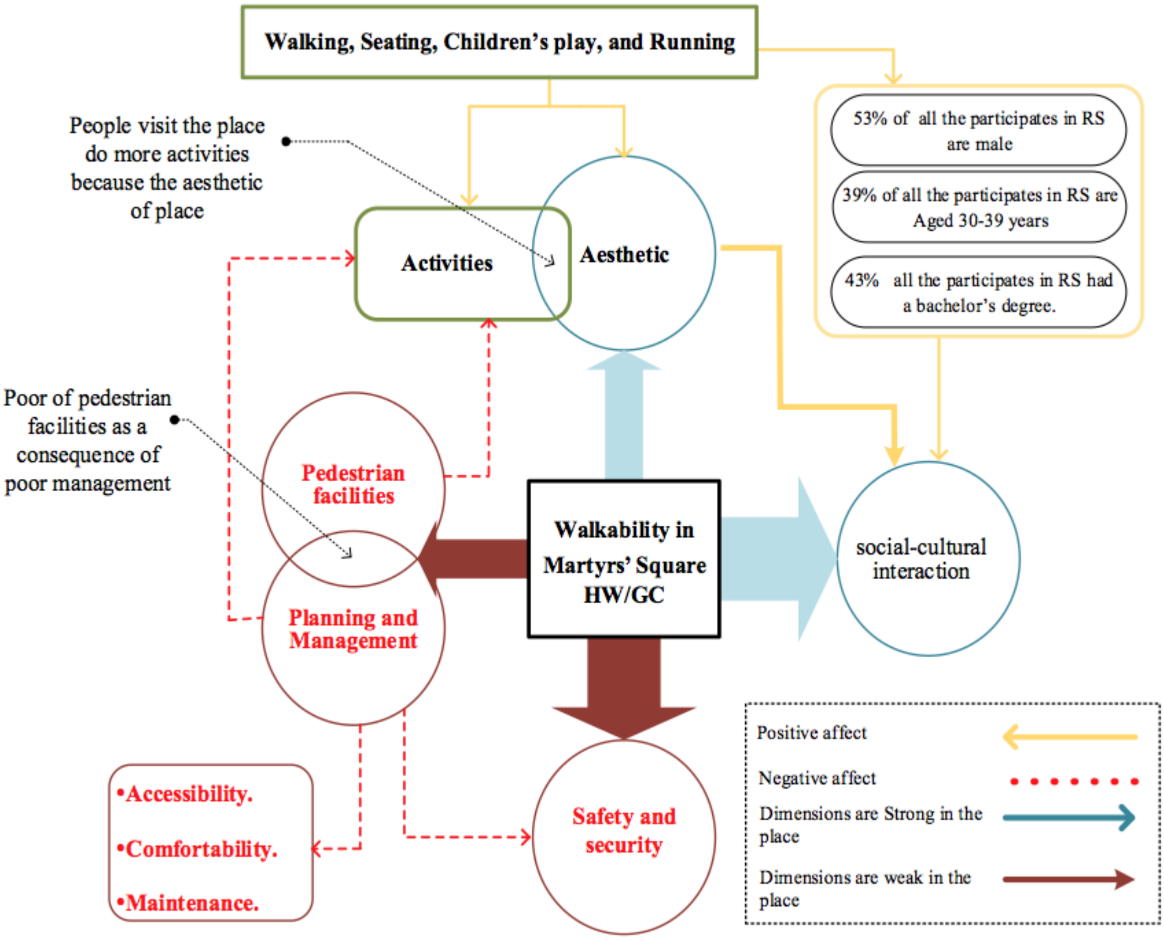


Figure 10-4 Walkability evaluation model in Martyrs' Square

Source: Author

10.3.3 Walkability evaluation model for Algeria Square (low walkable place with good environment condition)

In this model, the lack of walkability dimensions in AS is represented as pedestrian facilities, city planning-management, and social-cultural interaction. Figure 10-5 illustrates that the lack of planning and managing AS has a negative effect on the other walkability dimensions, such as pedestrian facilities and social-cultural interaction. Also, accessibility, comfortability, maintenance, and landscape have negative impacts on users walking for a long time or revisiting AS. On the other hand, the model shows that AS is a safe and secure place, which is because the Municipality of Tripoli headquarters is located in this place. AS is a symbol of the beautiful city of Tripoli, and the aesthetic value of the place has a positive impact on users.

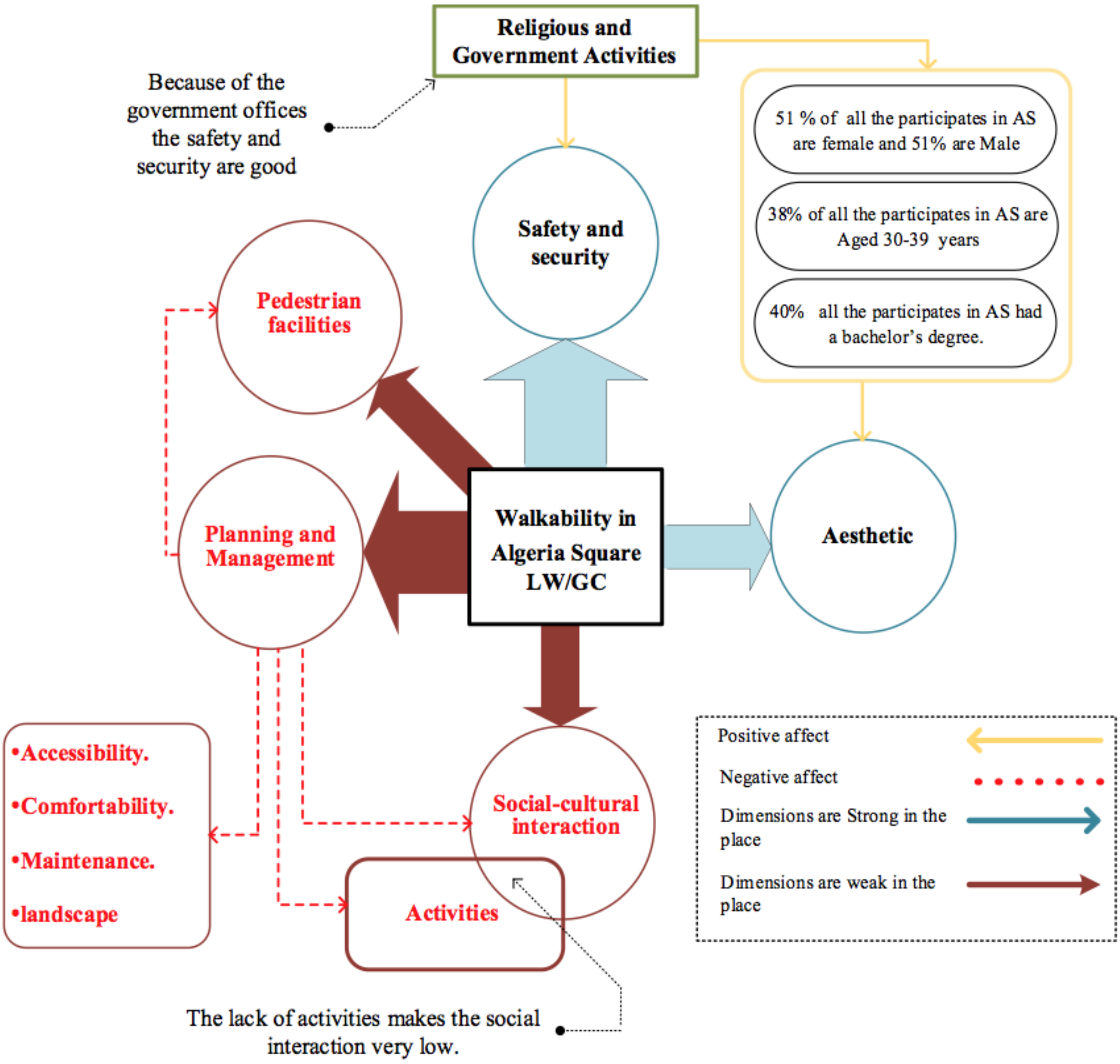


Figure 10-5 Walkability evaluation model in Algeria Square

Source: Author

10.3.4 Walkability evaluation model for Al-Rasheed Street (high walkable place with poor environment condition)

Figure 10-6 shows that the lack of walkability dimensions in RS is represented as pedestrian facilities, city planning-management, and aesthetics. The reason for the lack of pedestrian facilities is weakness in city planning and management. This research discovered that factors inhibiting the provision of pedestrian facilities include government corruption, poor implementation of plans, and a lack of development control. The model shows that commercial activities have a positive effect on users feeling safe in RS, as a result of which they prefer to revisit and spend time walking in the street, even with its poor environment condition.

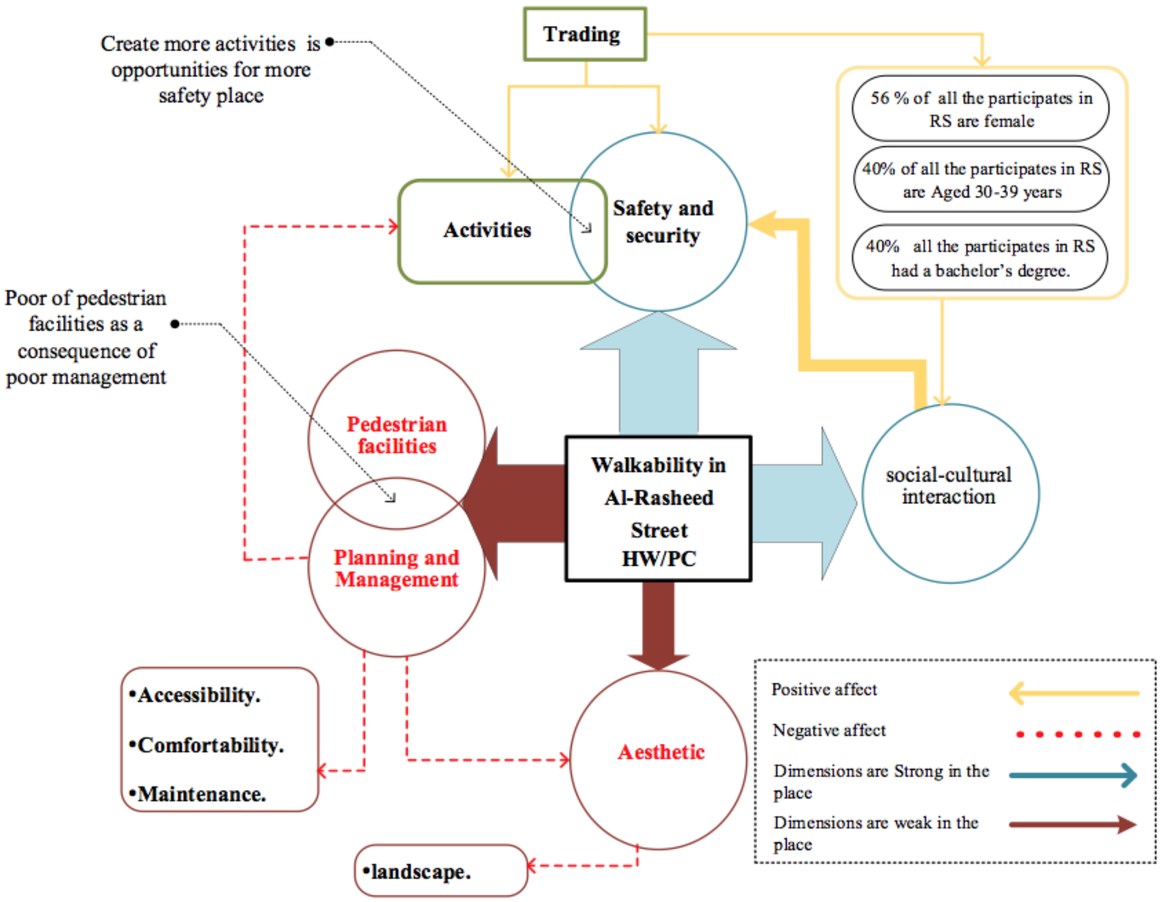


Figure 10-6 Walkability evaluation model in Rasheed Street

Source: Author

Tripoli does not collect specific data for determining the quality of the public open spaces from safety & security, pedestrian facilities, aesthetic, and social-cultural interaction. Over all findings shown in Table 6.7 indicate that age and education are the essential socio-demographic factors causing people to spend more time walking in the POS of Tripoli city centre. On the other hand, from the users' perspectives, the facilities, safety, and aesthetics were the most critical barriers limiting people spending a long time. The findings of the users' survey concur with the findings from observation method in this study, whereby in general Tripoli has lack of walking infrastructure, such as a lack of disabled, parking, pedestrian, seating, and shelter facilities. Ewing and Handy (2009), argued that the lack of certain POS facilities deters physical activity in its purest form of walking, and makes mobility difficult.

10.4 Walkability assessment framework for Tripoli city centre POS

This section presents the proposed assessment framework for the walkability in Tripoli's public open spaces, which addresses the final findings of this thesis. According to the results, the framework can be used to assess the level of the walkability of the people in Tripoli city centre. This framework established that there were inequalities in walkability dimensions between high and low walkable public places. For example, the diversity of activities such as trade, recreation, walking, seating, and meeting other people have positive impacts on users of highly walkable places, while the lack of activities in low walkable places has a commensurate negative impact on users.

The framework is based on analysis of the surveys of users (Chapter 6) and professionals (Chapter 7), the on-site observation (Chapter 8), and focus group discussions (Chapter 9), as illustrated in Figure 10-7. The framework in the first stage assessed five main dimensions that determine the level of walkability in Tripoli city centre. Pedestrian facilities, safety and security, and management and city planning were the three main dimensions having a major impact on users spending time to walk and revisit Tripoli's public open spaces, while socio-cultural and aesthetic dimensions had a minor role.

Several problems related to a lack of walkability factors have been identified as barriers that limit the walking experience in Tripoli, including:

- Lack of pedestrian facilities, such as shade and weather protection, car parking, seating and eating places, playgrounds and park or recreational facilities, sports, pathways (or the existence of significant barriers to pathways), disabled facilities, and lack of public conveniences (i.e. toilets).

- Lack of safety and security features, such as street lighting, pedestrian crossings, crossing lights, CCTB, and police patrols.
- Actual dangers are a direct deterrent, such as the high crime rate, high-speed traffic, and vehicle congestion.
- Lack of management and city planning, manifest in the dearth of social activities, public transportation, parking and traffic flow. Many participants mentioned the need for comprehensive institutional reform, including legislative, management, and financial training, as solutions for POS problems.
- Socio-cultural attributes inhibit walking, such as a car-dependent culture, lack of privacy, no POS for different types of people (e.g. according to age, gender, and disability), and the Libyan aversion to exercise and lack of knowledge and appreciation of the lifestyle benefits of walking.
- Aesthetics, such as poor architectural design, lack of naturally attractive places, and lack of place and building maintenance do not encourage walking.

The framework is intended to encourage the users in Tripoli to change their current mindset towards walking by effectively improving the identified POS dimensions, to enhance the walking experience. Five main strategies were consequently developed to promote walkability in Tripoli's city centre POS, as outlined in Figure 10-7:

- Walkable city centre requiring Enhance Pedestrian Facilities
- Enhance Safety and Security will Encourage Potential Pedestrian Numbers
- Enhance Management and City Planning will encourage Walkability in Tripoli city centre.
- Walkability as a Culture Practice

- Enhance the Aesthetic of POS in Tripoli will encourage Walkability in Tripoli city centre.

10.4.1 Walkable city centre requires enhanced pedestrian facilities

Understanding pedestrians' needs and the reasons for choosing to walk in POS is essential issue. Pedestrian needs in POS are complex, but providing the minimum of user needs can make a major difference to the success or failure of a space. The findings of this study through the questionnaire survey, observation, and FGD affirm that the majority of the current main streets in Tripoli city centre are not conducive to a well-balanced, pedestrian-friendly environment. Tripoli has a car-reliant and dominant infrastructure with increasing traffic congestion and pollution, and insufficient pedestrian walkways and vulnerability and unsafety of pedestrians.

On the other hand, the FGD in this research agreed with Abdulla et al. (2016) and Lakhder and Dugeny (2010) in their finding that Tripoli has good possibilities to be a walkable city, because of its intrinsically good street design and good width of walkways. Providing clean and well-maintained POS makes them more desirable areas that welcome all users and encourage them to visit more and stay for longer, and providing comfortable furniture such as seating, public toilets, shelters, and pavements could facilitate pedestrian movement during adverse weather conditions.

The findings also revealed that public transportation is not available at all times and it is not efficient, thus people usually use their vehicles, and they need car parking with an efficient public transportation system. In the same way, improving the public transport system is the crucial only solution for the major problems such as traffic congestion, lack of parking space and the small, congested urban roads.

It is high priority to creating pedestrian-friendly transition areas with a new pavement plan could unify the pavements pattern with the soft landscape. As a result of this study, a redesign, renovation and maintenance of the buildings in Tripoli city centre is highly recommended, and there is a fundamental requirement to provide access for disabled people to all POS in the city centre and other urban elements, with suitable ramps and appropriate pavement surfaces for moving wheelchairs.

10.4.2 Enhanced safety and security encourage pedestrian numbers

Walkability, safety, and security are important factors in determining urban life on and around POS. Safety infrastructure is one of the safety elements, but it does not completely reflect the potential pedestrian risk in POS. Reflecting on the results of this thesis, the absence of police and the proliferation of weapons were the main threats for pedestrians in POS of a city that has armed conflicts. This research demonstrated that walkability is no longer associated with the physical environment only, but safety and security also play an important role in attracting people to POS for walking. Moreover, it is considered that security and extending the rule of law should be the foundation for a sustainable city, because with the lack of security, daily activities are becoming risky.

Numerous researchers (Echeverria et al., 2004; Loukaitou-Sideris & Eck, 2007; Abdul Karim & Azmi, 2013; Kerr et al., 2015) reviewed the mixed findings regarding the association between walkability and safety-security. People feel safest in places that are busy with others going about their ordinary activities (Jacobs, 1961). Nowadays the crime rate in Libya is high, as NUMBEO (2017) illustrated in their reports.

On other hand, in order to promote walkability in POS, **it is high priority** that several safety and security elements needed to be done to support a walkable environment in Tripoli's POSs. Based on the characteristics of the problems identified in this research, the high level of traffic flow in combination with mobility problems in pedestrian infrastructure and maintenance incites pedestrians to walk in the street or cross outside designated crossings, thus undermining their safety. In conclusion, it is proposed that an increase in pedestrian safety can be achieved by controlling vehicle speed at unprotected mid-block marked crossing; creating footpaths; creating and maintaining traffic signals; and controlling all the junctions around MS and pedestrian crossings by traffic signals. Also, to reduce crime within POS in cities with armed conflict, there are several elements needed, such as setting up activities and encouraging people to walk in groups, installing CCTV, and the police intensifying foot patrol.

10.4.3 Enhanced management and city planning encourage walkability

Carmona and De-Magalhaes (2006) emphasized that the failure of public space management 'to deal promptly with periodic maintenance, cleanliness and aesthetic appearance can lead to the impression that no one cares, and quickly propel an area into decline'. In order to ensure and establish walkability in Tripoli city centre, better management of its POS is **high priority**. Training opportunities should be provided to empower personnel so they can exercise autonomy and independence to advance and promote walkable POS. Also, there is a need to design a sustained public education programme on walkability targeted at schools, universities, and community groups in the city. Also, cooperation between local organizations is essential to implement and manage the POS, such as the Libyan Urban Planning Association, the Department of Urban Planning in Municipalities, the National Organization for Information and Documentation, the Survey Department, and remote sensing centres. The good quality of public space management and the strong of by-laws to control illegal activities in public areas, such as leafleting, unauthorized trading, vehicle abandonment, littering and dumping garbage give a good opportunity to enhance the walkability in Tripoli's POSs.

Sennett (1977) illustrated that POS lacking substantial public activity were areas ‘to pass through, not to use’, remaining as ‘dead public space’. Also, Giddings et al. (2011) outlined that throughout history cities have been portrayed by the activities occurring in their POS. Therefore, such spaces play an important role in articulating the constructs of societies. Throughout history, Tripoli’s POS have been essential sites for social, economic, and political activity, with significant roles in gathering people to celebrate social occasion or to voice grievances. On the other hand, the observation method illustrated that the main activities in the four case study areas were commercial and work-related activities, with an absolute lack of children's playground and family activities.

The city of Tripoli and the POS in the city centre should be flexible to hold numerous activities including sitting, eating, shopping, doing different activities, and playing sports. Also the city municipality must diversify activities in POS, such as sports, social, and religious activities. In the same way, the management of POS should give an equal access to all people (e.g. in terms of age, gender, and education).

10.4.4 Walkability as a cultural practice

Malkoc et al. (2007) argued that different cultures have different usage patterns for their use of POS and their engagement in walking or recreational activities. Social-cultural play a major role in influencing the attitudes and behaviours of all users (Abbasi, 2014). The scholars of planned behaviour illustrated that attitudes of users are strongly influenced by social-cultural; people are most likely to walk more when they understand the benefits of walking to their quality of life in terms of safety, health, economy, social, and environmental perspectives (Adam, 2013). The FGD agreed that not enough action was taken by Tripoli's local authorities to shift people away from motorised cars culture towards walking everyday journeys. Also, participants considered that the diversity of historical places, POS, and commercial activities in the centre of Tripoli can have a positive effect on the increase of the walking culture, time spent from users in walking and increase the number of revisits to the POS in the city centre. The number of users of Tripoli's POS could also increase if people were aware of the benefits of walking, which can be disseminated by local authorities though advertising (i.e. public information) films. On the other hand, the government's reluctance to seriously consider traffic restraints and to build streets for people rather than cars is impeding people's ability to walk

10.4.5 Enhancing the aesthetics of POS in Tripoli city centre will encourage walkability

Providing clean and well-maintained POS makes them more desirable areas that welcome all users and encourage them to visit more and stay for longer. Aesthetic appreciation relates to the beauty (or ugliness) of a place (Woolley, 2003). The aesthetic elements of POS, such as the general maintenance, air quality, and presence of trees, favour walking for pedestrians (Kahana et al., 2003). Maintenance the place and buildings, street trees, road landscape, visual quality of place; all are type of place aesthetic and makes place be attractive to walk.

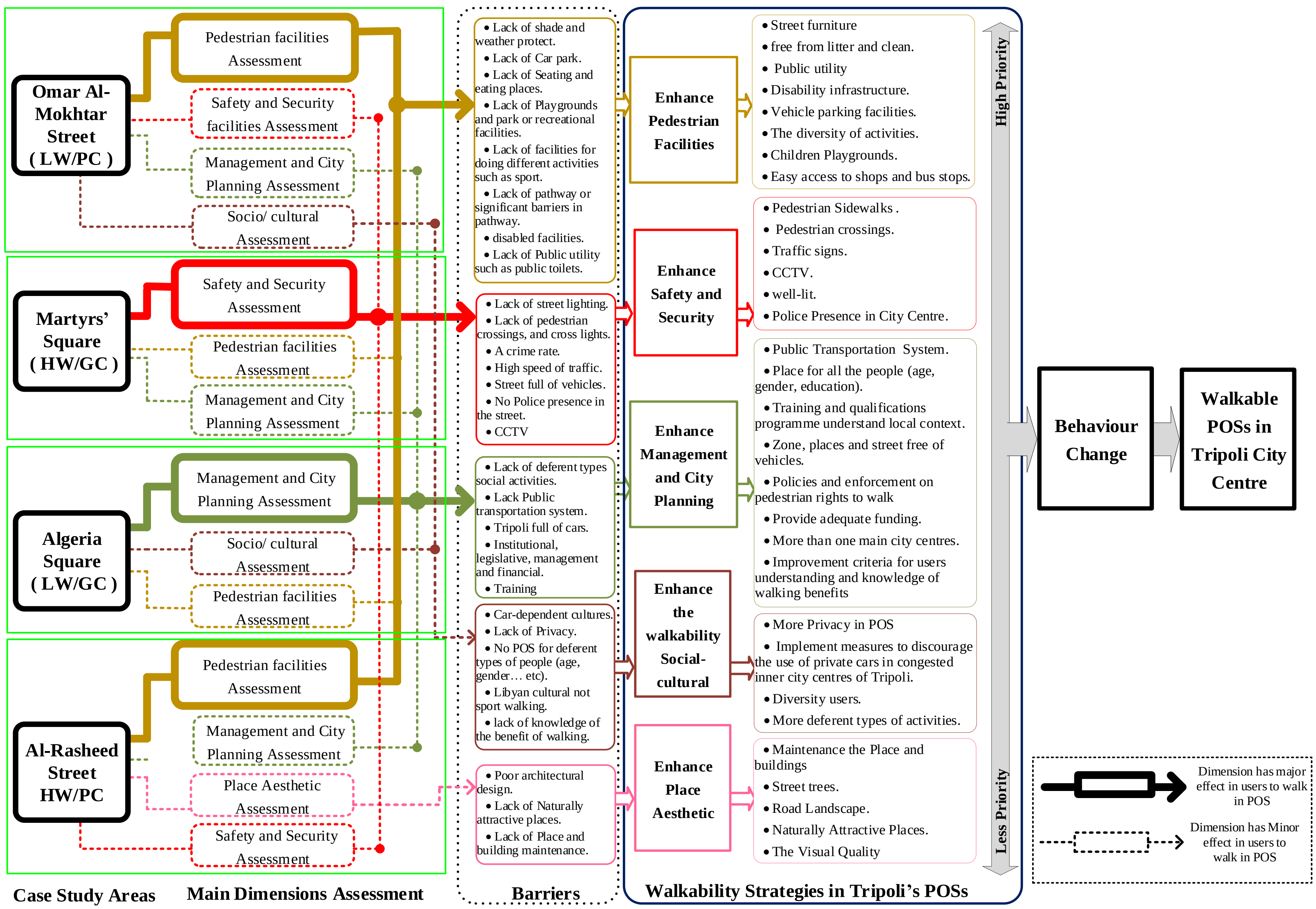


Figure 10-7 An Assessment Framework For Walkability in Tripoli's city centre Public Open Spaces

10.5 Summary

This chapter has constructed a clear picture of the barriers of different weighting that hinder people’s decisions to walk down a POS, and also established the main walkability dimensions the affect people’s decisions to spend time walking and revisiting the POS. Relevant literature sources were used to buttress the discussion, including in the detailed discussions on the various elements that makes up the four principal strategies to support walkability in Libyan cities and to assist in the successful walkable POS in Tripoli as developing a city, and a city with a conflict situation. It must be noted that the principal strategies came about as a result of a thorough analysis of all data and information collected through the research process, related to meeting the aim of this thesis and achieving the stated objectives.

Chapter 11

Conclusions and Recommendations

To improve walkability in Tripoli's POS, it is essential to find out which dimensions and factors are related, and which affect walkability in POS. The main aim of this research was to analyse barriers and success factors that influence the effective walking experience in Tripoli, Libya. As shown in Chapter 1, this thesis set one aim: to provide a comprehensive analysis of barriers and factors that influence effective practices, compatibility, and application of the nation of 'walkability' for urban and civic public spaces in Libyan cities, and to develop a framework for planning strategies for walkability as a creative tool to inform the efficiency, performances, and user experience of a walkable (i.e. walker-friendly) city.

11.1 Meeting the objectives

The study has achieved its aim by meeting the following objectives.

1. To investigate the notion of walkable public open spaces, best practices of walkable POS in Libyan cities.

To base this study on a clear theoretical framework, literature associated with the concepts of walkability in POS was studied. The literature review started with the definition and dimensions of POS, and POS in Libya (section 2.7). The first objective was achieved through the review of the literature chapters, Therefore, the researcher carried out a comprehensive review of literature in critical dimensions and factors in walkability in POS in developed countries, determining eight dimensions and 71 factors (section 3.7, Figure 3.7). However, a research gap was identified in that very few studies (English Language/ Arabic Language) have explored the topic of walkability in city centres' POS in the context of developing cities such as Tripoli, with different cultural and environmental conditions. Also, the study investigated extensively existing walkability measurement tools for POS (section 3.6).

2. To develop an evidence-based methodology and measurement tools to evaluate the suitability of those practices for Libyan cities.

The second objective was achieved in Chapter 5. This research is one of a very small number of studies attempting to study walkable city centres in developing countries in English Language and Arabic Language literatures. Delphi method in this research was used to build theory on walkable POS in Tripoli city centre as a developing city. In this stage of the research the exports involved in Delphi rounds one and two yielded seven dimensions and 45 factors in users' walking or revisiting Tripoli's POS. In general, the experts' opinions on Tripoli's walkable POS were consistent with those found in the literature on the diminution of walkable POS, while the number of factors was refined from 71 to 45 factors.

3. To explore the demographics, needs, and practices of public users in Tripoli's POS in terms of walkable spaces in a metropolitan centre in a post-conflict situation.

The third objective was achieved in Chapter 6. Questionnaire survey was designed for the users of POS in Tripoli city centre, and the results indicated that gender issues play a more important role for women more than men when exercising in POS, with females expressing more passion for walking in the study area. This is probably so because fewer women drive in Tripoli (section 6.1.2.2). Additionally, the findings indicate that there are different perspectives about the time people prefer to spend walking in public spaces depending on their age (section 6.1.2.3) and education level (section 6.1.2.4). Therefore, the different types of POS in Tripoli are not significant in revisiting the public spaces by users (section 6.1.2.5). On the other hand, no significant difference was determined between gender and frequency of visitation (section 6.1.2.6), and users of different age groups have different experiences about revisiting case study areas (section 6.1.2.7). No significant difference was identified between education level and frequency of visitation (section 6.1.2.8).

4. To identify users' experiences the time they spend, and the pedestrian movement patterns in the four case study areas in Tripoli POS.
5. To identify the barriers, needs, and success factors that affecting people walking in Tripoli POS from the perspectives of users and relevant professionals.

The results indicated that each of the POS has characteristics that distinguish it from others, which is why people prefer to walk for a long time in some locations and not in others. PCA identified three barriers affecting people's use and revisiting of POS (from the users' perspective): facilities, safety, and aesthetic barriers (Table 6.20). PCA also showed that there were five barriers preventing the creation of successful walkable public spaces in Tripoli (from the relevant professionals' perspectives), which were Lack of management and administration lack of safety and security strategy, lack of transportation system, lack of aesthetics and lack of training and knowledge (Table 6.46). Moreover, FGD agreed the main barriers that affect walkability in Tripoli's POS were safety and security barriers, facility/ physical barriers, socio barriers, accessibility barriers, and institutional / management/ Financial barriers (Figure 8.2)**.**

On the other hand, The Principal component analysis (PCA) also show that there were four success factors make people walking and revisiting POS (from the users' perception) aesthetic factors, safety and security factors, walking infrastructure facilities factors and social interactions factors. Likewise, the relevant professionals' perspectives show that there are six success strategies affecting walkability in Tripoli's POS:

1. More attention to safety and security.
2. Urban planners, designers, and managers should be encouraged to undertake intensive training.
3. Creating a centralized organization for design and planning POS.
4. More attention to pedestrian facilities.
5. Providing convenience & comfort facilities, such as public toilets, sites, etc.

6. Preventing traffic in some streets in the city centre and customizing them as pedestrian areas for walkability.

FGDs endorsed six main success factors required to improve walkability in Tripoli, namely improved management, law enforcement and establishing a new institution to manage the POS; multiple major city centres; awareness that walkability is healthy, safe, economical, and conducive to social interactions; more walkable facilities are needed and recognition of non-motorized means of transport; improved public transportation system is essential; and different types of activities should be possible at different times (Figure 9-3).

6. To evaluate walkability in Tripoli city centre in terms of planning, producing, managing, and maintaining POS, as well as the factors of walkability, according to the opinions of professionals and experts.
7. To develop and validate a framework for planning strategies for walkability as a creative tool to inform the efficiency, performances, and user experience of a walkable urban environment.

This research suggests assessment framework for the success of walkability in Tripoli's city centre POS with 5 main strategies (section 10.4, Figure 10-7 An Assessment Framework For Walkability in Tripoli's city centre Public Open Spaces):

- Walkable city centre requiring Enhance Pedestrian Facilities
- Enhance Safety and Security will Encourage Potential Pedestrian Numbers
- Enhance Management and City Planning will encourage Walkability in Tripoli city centre.
- Walkability as a Culture Practice
- Enhance The Aesthetic of POS in Tripoli will encourage Walkability in Tripoli city centre.

11.2 Recommendations

The findings of this thesis support some important recommendations that could be useful for developing Tripoli to be a more walkable city. The barriers, factors, that affected Tripoli's POS with a variety of points, suggestions, and recommendations have already been presented in previous chapters. Some specific recommendations are presented in this section.

1. The research has illustrated that the majority of the current POS (streets and squares) in Tripoli city centre are not conducive to well-balanced, pedestrian-friendly spaces. Moreover, Tripoli has a car-reliant and dominant infrastructure, with increasing traffic congestion and pollution, and insufficient pedestrian walkways characterised by vulnerability and lack of safety for pedestrians. As a short-term measure, there is an urgent need to adopt a new policy which should give the priority to pedestrians in terms of separating vehicles from pedestrian pathway, particularly allocating streets in the centre of Tripoli for pedestrians only, and understanding the pedestrians' needs and the reasons for choosing to walk in POS over other options.
2. Providing clean and well-maintained POS makes them more desirable areas that welcome all users and encourage them to visit more and stay for longer, and providing comfortable furniture such as seating, public toilets, shelters, and pavements can facilitate the pedestrian movement during adverse weather conditions. Also, the findings of this study revealed that public transportation is not available at all times, and is not efficient, thus people usually use their vehicles, and they need car parking. Thus one of the most expedient ways to alleviate traffic congestion and the consequent problems it brings is to increase the quality and efficiency of the public transportation system; this would reduce the chronic overburden placed on the existing road infrastructure and urban areas generally.

3. Pedestrian-friendly transition areas with a new pavement plan should be designed to unify the pavements pattern with the soft landscape. The redesign, renovation, and maintenance of the buildings in Tripoli city centre is highly recommended, including the provision of access for disabled people and to all POS in the city centre, and other urban elements.
4. Walkability, safety, and security are important factors in determining urban life on and around POS. Safety infrastructure is one safety elements, but it does not completely reflect the potential pedestrian risk in POS. Reflecting on the results of this thesis, the absence of police and the proliferation of weapons were the main threats for pedestrians in POS of a post-conflict city with armed conflicts.
5. This research demonstrated that walkability is no longer associated with the physical environment only, but safety and security also play an important role in attracting people to POS for walking. Moreover, it is proposed that an increase in pedestrian safety can be achieved by controlling vehicle speed at unprotected mid-block marked crossing; creating footpaths; creating and maintaining traffic signals; and controlling all the junctions around POS and pedestrian crossings by traffic signals. Also, to reduce crime within POS in city with armed conflict, several elements are needed, such as setting up activities and encouraging people to walk in groups, installing CCTV, and the police intensifying foot patrols.
6. Therefore, the city of Tripoli and the POS in the city centre should be flexible to hold numerous activities including sitting, eating, shopping, doing different activities and playing sports. Also, the city municipality of Tripoli must diversify activities in POS, such as sports, social, and religious activities and festivals. In the same way, the management of POS should give equal access rights to all people, without discrimination or barriers related to age, gender, or educational level.

7. In order to ensure and establish walkability in Tripoli city centre, better management of its POS is required. Training opportunities should be provided to empower personnel so they can exercise autonomy and independence to advance and promote walkable POS. Also, there is a need to design a sustained public education programme on walkability targeted at schools, universities, and community groups in the city.
8. A master plan and guidelines for the provision of POS are needed, outlining relevant types and conditions of POS and associated factors, with an integrated management plan and proportion per capita in developments, with increased awareness of the importance of walkability among professionals.
9. Cooperation between local organizations is essential to implement and manage the POS, such as the Libyan Urban Planning Association, the Department of Urban Planning in Municipalities, the National Organization for Information and Documentation, the Survey Department, and remote sensing centres.

11.3 Limitations of the research

In research work, researchers should be honest in reporting all the issues of their research, including any limitations (Cohen et al., 2007). It should be borne in mind that data on travel behaviour in a city of a developing country such as Libya is minimal, particularly during recent years since the 2011 conflict and ongoing violence in the country. Therefore, the researcher faced numerous particular barriers in addition to those that customarily faced similar research studies, such as in terms of resources, time, and expert participants.

There are limited resources available from empirical investigations into urban design planning, walkability, diminution walkable please, and factors that affect people to walk and revisit the POS in Libyan city centres. Likewise, there is a limited access to the data (or lack of data) required for identifying research problem such as number of traffic accidents, number of deaths due to crash with vehicles in the city centre, and the reality of city centre planning and expansion in Tripoli with respect to walkability. It was under these limitations that the thesis was planned and carried out, not only to address the existing problem but to create a new strategy for local authorities, urban planning, and urban designers through understanding the walkability and users' needs, in additional to creating opportunities for people to walk in local POS.

Due to lack of time granted by the Department of Higher Education in Libya to complete this research, there was not a possibility to investigate all Libyan cities' POS to compare the results. Travelling between the UK and Libya for fieldwork was difficult because of the situation in Libya and the limited financial resources of the researcher due to national political and economic problems, such as the frequent delays in student stipends.

Finally, the case study areas were in Tripoli city centre, which made the research fieldwork dangerous in terms of personal safety and physical conditions of the congested urban core of Tripoli, facing all of the barriers to walkability identified by the study, and using observation tools such as digital cameras and video recorders was particularly dangerous because of the safety situation in Libya. Additionally, the lack of car parking facilities near the case study areas meant that the researcher had to waste valuable time in car parking.

Overall, this thesis can be seen as an experiment at the border between walkability and public open spaces, aiming to express in a formula, a complex social concept – the publicness of public space. This study has been done in conflict situation in Libya, so some of the mentioned limitations when the conflict stop in Libya could be further attenuated and corrected to improve the study.

11.4 Contribution to knowledge

Most of the studies on the adoption of walkability have been conducted in developed countries, and studies considering walkability in developing cities are still scarce (in English language and Arabic language). Moreover, previous studies of walkability in developing cities used small samples of their investigation or they focused only on one aspect of walkability. This was the first study to examine the validity of walkability factors as a measure of walkable POS in the four case study areas in Tripoli (and indeed Libya) as a developing country context.

Also, this thesis contributes to narrowing the gap in knowledge concerning walkability studies in Libya in general and in the Tripoli context in particular, particularly on barriers and factors that influence effective practices of the nation of 'walkability' for urban and civic public spaces in Libyan cities. It is gives clear ideas about POS in Tripoli, and how they are used.

This research contributes practically through the city centre POS walkability assessment recommendations, which is a relatively new tool, and wholly unique in the context of Libya. This assessment recommendations helps to provide policy makers and development agencies with useful guidance to evaluate and determine the level of walkability of city-centre POS. Also, the research achieves its main aim to analyse barriers and success factors that influence the effective walking experience in Tripoli. In this, it makes a number of contributions to existing knowledge. Another contribution to this research, is that it applies a sophisticated methodology, including Delphi method, to determine the factors the affect walking in Libyan POS.

11.5 Future research

The following recommendations are made for future research work:

- Replicate the case study for other Libyan cities to examine their urban POS and to study their walkability practice, and to extend the understanding of walkability factors, and associated barriers.
- This study was undertaken in the context of armed conflict in Libya, which affected the results of this research, because people in Libya nowadays are worried about their

personal and family safety. There is a need to research and review of barriers and success factors affected walkability in POS in Libya under conditions of normalcy (i.e. a stable security situation).

- Research can be further developed and expanded to deal with specific issues, such as a review of the relationship between walkability and public transportation, the impact of local socio-cultural aspects and security and safety contexts and their role in decisions to walk or to use a car.
- A more detailed investigation of walkability using different software such as GIS, Massmotion Pedestrian Movement Simulation, or Virtual Reality could test different aspects and dimensions of walkability factors and pedestrian movement.

References

Abbasi, A., Alalouch, C. and Bramley, G., 2016. Open Space Quality in Deprived Urban Areas: User Perspective and Use Pattern. Procedia - Social and Behavioral Sciences, 216, 194-205.

Abbasi, I.N., 2014. Socio-cultural Barriers to Attaining Recommended Levels of Physical Activity among Females: A Review of Literature. Journal Quest, 66 (4).

Abdulla, K.M.A., Abdelmonem, M.G., and Selim, G., 2016. Understanding Walkability in the Libyan Urban Space: Policies, Perceptions and Smart Design for Sustainable Tripoli. International Journal of Civil, Environmental, Structural, Construction and Architectural Engineering, 10 (12), 1602-1610.

Abdulla, K.M.A., Abdelmonem, M.G., and Selim, G., 2017. Walkability in Historic Urban Spaces: Testing the Safety and Security In Martyrs' Square in Tripoli. International Journal of Architectural Research, 11 (3), 163-177.

Abdullah N. Addas, 2015. Motivation and Attachment in the Use of Public Open Spaces in Jeddah, Saudi Arabia. Doctor of Philosophy., University Of Sheffield.

Abley, S., 2005. Walkability Scoping Paper. Christchurch New: Abley Transportation Consultants.

Abley, S., and Turner, S., 2011. Predicting walkability. New Zealand: NZ Transport Agency research report.

Abraham H., 1970. Motivation Personality. Second ed. USA: Harper & Row.

Abubrig, I.A., 2012. Towards a Holistic Islamic Urbanism: Planning for Tripoli in the New Libya. Doctor of Philosophy., University of Leicester.

Adam, M., 2013. An Exploration of the Employee’s Perception of Walking: Enhancing the Walking Experience in Kuala Lumpur. University of Salford.

Adam, M., 2013. More pedestrians in Tripoli’s POSs offers Potential Safety and Security for the City’s Users. University of Salford.

Adhya, A., 2008. Urban design re-examined: urban vs. design. In: Oxford Conference on Architecture Education, 2008. Oxford University: WIT Press, .

Akins, R.B., Tolson, H. and Cole, B.R., 2005. Stability of response characteristics of a Delphi panel: application of bootstrap data expansion. BMC Medical Research Methodology, 5, 37-37.

Alamdari, Z.J., and Habib, F., 2012. Urban public space designing criteria for vulnerable groups (Women and children) Canadian Journal on Environmental, Construction and Civil Engineering, 3 (4), 179-185.

Alexandrov, A.V., et al., 1996. Agreement on disease-specific criteria for do-not-resuscitate orders in acute stroke. Members of the Canadian and Western New York Stroke Consortiums. Stroke; a Journal of Cerebral Circulation, 27 (2), 232-237.

Al-Fenadi, Y., 2010. Meteorological information and road safety in Libya. Tripoli – Libya: Libyan National Meteorological Centre (LNMC).

Alfonzo, M.A., 2005. To Walk or Not to Walk? The Hierarchy of Walking Needs. Environment and Behavior, 37 (6), 808-836.

Alfonzo, M.A., 2005. TO WALK OR NOT TO WALK?: The Hierarchy of Walking Needs. Environment & Behavior, 37 (6), 808-836.

Algziri, S., 1995. The Libya study in geography In: A.B. Saad Algziri, ed., Urbanization Libya: Dar Libya.

Ali, Kh.O., Hashim, N., Rostam, K., and Jusoh, H., 2011. Population Growth in the Region of Tripoli, Libya. Australian Journal of Basic and Applied Sciences, 5 (11), 1609-1615.

Aljabri, H., 2014. The Planning and Urban Design of Liveable Public Open Spaces in Oman: Case Study of Muscat. Doctor of Philosophy., Heriot-Watt University.

AlSaleh, N.S., 2016. Identifying Health Education Competencies for Primary Health Care Nurses in Saudi Arabia: A Delphi Consensus Study. Doctor of Philosophy., University of Salford, Manchester.

Al-Shawabkeh, R., 2015. The role of sustainable urban design principles in delivering high density mixed use schemes in Jordan: Using Amman as a case study. Doctor of Philosophy., The University of Brighton.

Alzklaa, N., 2016. Evaluating Public Squares According to the World Organization for Projects of Public Spaces Case Study: Al-Shuhada Square. Master., University of Tripoli.

Alzklaa, N., 2016. Evaluating Public Squares According to the World Organization for Projects of Public Spaces Case Study: Al-Shuhada Square. Master., University of Tripoli.

Ameen, R.F.M., Mourshed, M. and Li, H., 2015. A critical review of environmental assessment tools for sustainable urban design. Environmental Impact Assessment Review, 55, 110-125.

Andrews, M. and Gatersleben, B., 2010. Variations in perceptions of danger, fear and preference in a simulated natural environment.

Appleyard, D., 1980. Livable streets: protected neighborhoods? Urban Design International, 1 (5), 32-33,39-40.

Araabi, H.F., 2015. A typology of Urban Design theories and its application to the shared body of knowledge. URBAN DESIGN International Advance Online Publication, , 1-14.

Ariffin, R.N.R. and Zahari, R.K., 2013. Perceptions of the Urban Walking Environments. Procedia - Social and Behavioral Sciences, 105, 589-597.

Askari, A.H., 2014. Assessment of Urban Public Spaces: Cases Of Kuala Lumpur City Center. Doctor of Philosophy., Universiti Malaya.

Austin, E.K., 2002. The Social Bond and Place:a Study of how the Bureau of Land Management Contributes to Civil Society. Administrative Theory & Praxis (Administrative Theory & Praxis), 24 (2), 355.

Azlitni, B., 2009. The Libyan Architectural Features between Tradition and Modernization. Int. Journal for Housing Science, 33 (3), 137-148.

Badland, H.M., Opit, S., Witten, K., Kearns, R.A., and Mavoa, S., 2010. Can Virtual Streetscape Audits Reliably Replace Physical Streetscape Audits? Journal of Urban Health: Bulletin of the New York Academy of Medicine, 87 (6), 1007-1016.

Badoe, D.A. and Miller, E.J., 2000. Transportation–land-use interaction: empirical findings in North America, and their implications for modeling.

Ball, K., et al., 2001. Perceived Environmental Aesthetics and Convenience and Company Are Associated with Walking for Exercise among Australian Adults.

Barbara, G., and Fidell, L.S., 2006. Using Multivariate Statistics. 5 rd ed. New York: Pearson.

Bashir R., Kh. Azlitni., 2005. The Development of Physical and Urban Planning Systems in Libya Sustainability of Planning Projects. Transforming Housing Environments through Design, 1-7.

Beavon, D. J. K., Brantingham, P. L., and Brantingham, P. J. 1994. The Influence of Street networks on the patterning of property offenses. Criminal Justice Press/Willow Tree Press.

Beavon, D.J.K., 1984. Crime and the environmental opportunity structure the influence of street networks on the patterning of property offences. M.A., Simon Fraser University (Canada).

Behrens, R.B., and Watson, V., 1996. Making Urban Places: Principles and Guidelines for Layout Planning. illustrated ed. University of Cape Town: Urban Problems Research Unit.

Bentley, I., Murraine, P., McGlynn, S., Alcock, A. and Smith, G.P, 1985. Responsive Environments: A Manual for Designers. first ed. London: Architectural Press.

Berke, E.M., et al., 2007. Association of the Built Environment With Physical Activity and Obesity in Older Persons. American Journal of Public Health, 97 (3), 486-492.

Biondo, P.D., et al., 2008. Applying the Delphi process to palliative care tool development: lessons learned. Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer, 16 (8), 935-942.

Borst, H.C., et al., 2009. Influence of environmental street characteristics on walking route choice of elderly people.

Briggs, S.R. and Cheek, J.M., 1986. The role of factor analysis in the development and evaluation of personality scales. Journal of Personality, 54 (1), 106.

Brinberg, D., McGrath, J.E., 1985. Validity and the research process. London: SAGE Publications.

Brown, D.S., 1982. Between Three Stools: A Personal View of Urban Design and

Pedagogy. In: e. IN Ann Ferebee, ed., Education for Urban Design. New York: Institute for Urban Design, 1982, pp. 132-172.

Brownson, R.C., Chang, J.J., Eyler, A.A., Ainsworth, B.E., Kirtland, K.A., Saelens, B.E. and Sallis, J.F., 2004. Measuring the environment for friendliness toward physical activity: a comparison of the reliability of 3 questionnaires. American Journal of Public Health, 94 (3), 473-483 11p.

Brownson, R.C., Hoehner, C.M., Day, K., Forsyth, A. and Sallis, J.F., 2009. Measuring the built environment for physical activity: state of the science. American Journal of Preventive Medicine, 36 (4), S99-123.e12.

Bryman, A., 1988. Quantity and quality in social research. first ed. London: Sage Publications.

Bureas of Statistics and Census-Libya, 2010. Statistics Book. Bureas of Statistics and Census-Libya, .

Burton, E. and Mitchell, L., 2006. Inclusive urban design: streets for life. Amsterdam; London: Architectural.

Camerino, O., Castañer M., and Anguera, T.M., 2012. Mixed Methods Research in the Movement Sciences: Case studies in sport, physical education and dance. First ed. USA and Canada: Routledge.

Cao, X., Handy, S.L., and Mokhtarian, P.L., 2009. Examining the Impacts of Residential Self-Selection on Travel Behaviour: A Focus on Empirical Findings. Transport Reviews, 29 (3), 359-395.

Carmona M., and Tiesdell, S., 2007. Urban design reader. Amsterdam; London: Architectural.

Carmona, M . Heath, T.T., and Tiesdell, S., 2003. PUBLIC PLACES -URBAN SPACES,The Dimensions of Urban Design. first ed. Oxford, UK: Elsevier.

Carmona, M., 2014. The Place-shaping Continuum: A Theory of Urban Design Process. Journal of Urban Design, 19 (1), 2-36.

Carmona, M., 2014. Explorations in Urban Design: An Urban Design Research Primer. England: Ashgate Publishing,.

Carmona, M., Heath, T., Oc T., and Tiesdell, S., 2003. PUBLIC PLACES-URBAN SPACES The Dimensions of Urban Design. First ed. Oxford: UK: Architectural Press.

Carmona, M., Heath, T., Oc, T., and Tiesdell, S., 2011. Public Places - Urban Spaces: The Dimensions of Urban Design. 2nd Edition ed. Oxford Uk: Architecture.

Castells, M., 1977. The Urban Question – A Marxist Approach.: Edwin Arnold. First ed. London: Edward Amold.

Cerin, E., et al., 2010. Perceived barriers to leisure-time physical activity in adults: an ecological perspective. Journal of Physical Activity & Health, 7 (4), 451-459.

Cervero, R. and Kockelman, K., 1997. Travel demand and the 3Ds: Density, diversity, and design. Transportation Research Part D: Transport and Environment, 2 (3), 199-219.

Cervero, R., 2006. Alternative Approaches to Modeling the Travel-Demand Impacts of Smart Growth. Journal of the American Planning Association, 72 (3), 285-295.

Cinderby, S., 2010. How to reach the 'hard-to-reach': the development of Participatory Geographic Information Systems (P-GIS) for inclusive urban design in UK cities. Area, 42 (2), 239-251.

Clarkson, J., 2003. Inclusive design: design for the whole population. London; New York, N.Y: Springer.

Clayton, M.J. and Clayton, M.J., 1997. Delphi: a technique to harness expert opinion for critical decision-making tasks in education. Educational Psychology, 17 (4), 373-386.

Cohen, J., 1992. A Power Primer. American Psychological Association, 112 (1), 155-159.

Cook, R.S., 1980. Zoning for Downtown Urban Design: How Cities Control Development. First ed. New York: Lexington Books.

Cora L. Craig, et al., 2003. International Physical Activity Questionnaire: 12-Country Reliability and Validity. Medicine & Science in Sports & Exercise, 35 (8).

Courtney, E., 2011. Exploring the Palliative Care Needs and Delivery of Services to Young Children with Life-Limiting Neurodevelopmental Disabilities and their Families: A Mixed Methods Study. Doctor of Philosophy., Dublin City University.

Cozens, P.M., Saville, G. and Hillier, D., 2005. Crime prevention through environmental design (CPTED): a review and modern bibliography. Property Management, 23 (5), 328-356.

Crane, R., 2000. The Influence of Urban Form on Travel: An Interpretive Review. Journal of Planning Literature, 15 (1), 3.

Creswell, J.W., 2009. Research Design: Qualitative, Quantitative, And Mixed Methods Approaches. Third Edition ed. los Angeles: SAGE.

Creswell, J.W., 2014. A Concise Introduction to Mixed Methods Research (Sage Mixed Methods Research). first ed. London: SAGE.

Crowe, T.D., author. and Fennelly, L.J., 2013. Crime prevention through environmental design. Third edition. ed. Amsterdam: Butterworth-Heinemann.

Cubukcu, E., 2013. Walking for Sustainable Living.

Cuthbert, A.R., 2003. Designing Cities Oxford: Blackwell .

Cuthbert, A.R., 2005. A debate from down-under: spatial political economy and urban design. Urban Design International, 20 (3), 223-234.

Cuthbert, A.R., 2006. the from of cities ,Political Economy and Urban Design. First ed. 350 Main Street, Malden, MA 02148-5020, USA: Blackwell Publishing Ltd.

Cuthbert, A.R., 2007. Urban design: requiem for an era - review and critique of the last 50 years. Urban Design International, 12 (4), 177-223.

Child A., and Falconer, R., 2015. Walkability Study. Australia: Arup.

Chiu, M., Shah, B., Rezai, M., Austin, P. and Tu, J., 2014. Neighbourhood Walkability and Risk of Obesity.

Choi, E., 2013. Understanding Walkability: Dealing with the complexity behind pedestrian behavior. Sejong University, , 14.

Chow, R.Y., 2002. Representing detached dwelling: a survey . Architectural and Planning Research, 19 (2), 149-164.

Dailey, A.L., 1988. Faculty Consensus at a Multi-Campus College through Delphi. Community/Junior College Quarterly of Research and Practice, 12 (1), 21-26.

Davies, N., 2016. Investigating route-choice by recreational walkers in the English Lake District. University of Central Lancashire.

Decrop, A., Pizam, A. and Mansfield, Y., 1999. Chapter 5: Tourists' Decision-Making and Behavior Processes. In: Chapter 5: Tourists' Decision-Making and Behavior Processes. Haworth Press, Inc, 1999, pp. 103-133.

Department of Health and Human, 1996. Department of Health and Human Services, United States.

Department of the Environment (DoE), 1997. Planning Policy Guidance UK.

Ding, D., et al., 2011. Neighborhood Environment and Physical Activity Among Youth.

Diversity Council, 2008. Diversity Tip Sheet Cross-Cultural Communication Translating Nonverbal Cues. Diversity Toolkit for Business.

Dixon, D.F., 2005. Urban Design Services first ed. New York: the american institute of architects.

Doyle, S., et al., 2006. Active Community Environments and Health.

Duffy, C.M., 2009. Indoor Recreational Walking in Semi-Public Spaces: Assessing Demand and Design Standards. the Massachusetts Institute of Technology.

Echeverria, S.E., Diez-Roux, A. and Link, B.G., 2004. Reliability of self-reported neighborhood characteristics. Journal of Urban Health: Bulletin of the New York Academy of Medicine, 81 (4), 682-701.

Eichner, R and Tobey, H., 1987. Beyond Zoning. In: MOUDON. In: Anne Vernez Moudon, ed., Public Streets for Public Use. New York: Van Nostrand Reinhold, 1987, .

El- Allous, A.M.O 2016. The Historical Transformation of Civic Architecture: City Council Buildings and Urban Change in Tripoli, Libya. Degree of Doctor of Philosophy., Newcastle University.

Elgarhy, M.A., 2016. An Analysis of Policy Making for Dry Port Location and Capacity: A Case study on Alexandria. Doctor of Philosophy., University of Plymouth.

El-Khoury R., and Robbins, E., 2004. Shaping the City: Studies in History, Theory and Urban Design. New York: Routledge.

Elmehdawi, R.R. and Albarsha, A.M., 2012. Obesity in Libya: a review. Libyan Journal of Medicine, 7 (1), 1-5.

Elmehdawi, R.R., and Albarsha, A.M., 2012. Obesity in Libya: a review. Libyan Journal of Medicine, 7 (1), 1-5.

Ellis, C., 2014. Process and Principles in Urban Design. Journal of Urban Design, 19 (1), 47-48.

Emhamed, O., and Elbendak, M.A., 2008. Urban Transformation and Social Change in a Libyan City: An Anthropological Study of Tripoli. PhD degree., National University of Ireland.

Eom, H. and Cho, G., 2015. Exploring thresholds of built environment characteristics for walkable communities: Empirical evidence from the Seoul Metropolitan area. Transportation Research Part D: Transport and Environment, 40, 76-86.

Ewing R., and Cervero, R., 2010. Travel and the Built Environment. Journal of the American Planning Association, 76 (3), 265-294.

Ewing R., and Clemente, O., 2013. Measuring Urban Design Metrics for Livable Places. first ed. Washington: Island Press.

Ewing, R. and Handy, S., 2009. Measuring the Unmeasurable: Urban Design Qualities Related to Walkability. Journal of Urban Design, 14 (1), 65-84.

Ewing, R., and Cervero, R., 2001. Travel and the Built Environment: A Synthesis. Transportation Research Record, 1780 (1), 87–114.

Farley, R., 1971. Planning for Development in Libya: the exceptional economy in the developing world. New York: Prager.

Field, A,. 2009. Discovering Statistics using SPSS. 3rd ed. London, UK: SAGE Publications.

Finger M.E, Cieza A, Stoll J, Stucki G, and Huber E.O. 2006. Identification of intervention categories for physical therapy, based on the international classification of functioning, disability and health: a Delphi exercise. Physical Therapy, 86 (9), 1203-1220.

Fitzsimons, L., 2013. A multidisciplinary examination of walkability: Its concept, assessment and applicability. PhD., Dublin City University.

Forsyth, A., 2015. What is a walkable place? The walkability debate in urban design. Urban Design International, 20 (4), 274-292.

Forsyth, A., Oakes, J.M., Schmitz K.H., and Hearst M., 2007. Does Residential Density Increase Walking and Other Physical Activity? Urban Studies (Routledge), 44 (4), 679-697.

Foster, S. and Giles-Corti, B., 2008. The built environment, neighborhood crime and constrained physical activity: An exploration of inconsistent findings. Preventive Medicine, 47 (3), 241-251.

Fraenkel, J.R., Wallen, N.E., and Hyun, H., 2011. How to Design and Evaluate Research in Education. 8th ed. New York: McGraw-Hill Education.

Francis M., 2003. Urban open space : designing for user needs. Island Press.

Franck, K.A., and Paxson, L., 1989. Women and Urban Public Space: Research, Design, and Policy Issues. In: Irwin Altman & Ervin H. Zube, ed.,

Public Places and Spaces New York ed. Plenum Press, 1989, pp. 121-146.

Frank, L.D., Engelke, P., Schmid, T.L., 2003. Health and Community Design: The Impact of the Built Environment on Physical Activity. 2nd edition ed. Washington: Island Press.

Frank, L.D., and Engelke, P., 2000. How Land Use and Transport Systems Impact Public Health: A Litera-ture Review of the Relation between Physical Activity and Built Form”. Atlanta: Georgia Institute of Technology.

Frank, L.D., Schmid, T.L., Sallis, J.F., Chapman, J. and Saelens, B.E., 2005. Linking objectively measured physical activity with objectively measured urban form: findings from SMARTRAQ. American Journal of Preventive Medicine, 28 (2), 117-125.

Fuller, M., 2007. Moderns abroad: Architecture, cities and Italian imperialism. New York: Routledge.

Garcia-Ramon, M.D., Ortiz, A. and Prats, M., 2004. Urban planning, gender and the use of public space in a peripherial neighbourhood of Barcelona. Cities, 21 (3), 215-223.

Garde, A., 2014. Citizen Participation, Design Competition and the Product in Urban Design: Insights from the Orange County Great Park. Journal of Urban Design, 19 (1), 89-118.

Gehl, J., 1987. Life Between Buildings. Washington: Island Press.

Gehl, J., 1989. A Changing Street Life in a Changing Society. Places Journal, 6 (1).

Gehl, J., 2007. Public spaces for a changing public life. In: Catharine Ward Thompson and Penny Travlou, ed., Open Space: People Space. First ed. Oxford, Uk: Taylor & Francis, 2007, pp. 3-9.

Gehl, J., and Svarre, B., 2013. How to Study Public Life first ed. Washington DC: Island Press.

Ghadimkhani, P., 2011. Increasing Walkability in Public Spaces of City Centres: the Case of Tunali Hilmi Street, Ankara. Middle East Technical University.

Ghanbaran, A.H. and Mousavi, S.M., 2014. Planning Urban Open Spaces for Improving Livability within City. International Journal of Academic Research, 6 (5), 148-152.

Giannarou, L., and Zervas, E., 2014. Using Delphi technique to build consensus in practice. Int. Journal of Business Science and Applied Management, 9 (2), 65-82.

Gibson, L.J. and Miller, M.M., 1990. A Delphi model for planning `preemptive' regional economic diversification. Economic Development Review, 8 (2), 34.

Giddings, B., Charlton, J. and Horne, M., 2011. Public squares in European city centres. Urban Design International, 16 (3), 202-212.

Gilbert, N., 2008. Researching Social Life. 3rd ed. Landon: SAGE Publications.

Gilderbloom, J.I., Riggs, W.W. and Meares, W.L., 2015. Does walkability matter? An examination of walkability’s impact on housing values, foreclosures and crime. Cities, 42, 13-24.

Giles-Corti B., Timperio A., Bull F., and Pikora T., 2005. Understanding physical activity environmental correlates: increased specificity for ecological models. Exercise and Sport Sciences Reviews, 33 (4), 175-181.

Gindroz, R., 2003. The Urban Design Handbook - Techniques and Working Methods . New York: W.W.Norton & Company, Inc.

Glanz, T.A., 2011. Walkability, Social Interaction, and Neighborhood Design. University of Nebraska - Lincoln.

Glesne, C., 1999. Becoming qualitative researchers: An introduction. 4th ed. New York: Pearson.

Global Liveability Ranking, 2015. The world's most 'liveable' cities [online]. The economist. Available at: http://www.economist.com/blogs/graphicdetail/2015/08/daily-chart-5.

Gordon, T.J., 1994. The Delphi Method. In: The Delphi Method. American Council for the United Nations University.: Washington, DC, 1994, .

Gosling, D., 2002. The Evolution of American Urban Design: A Chronological Anthology. first ed. Sussex, uk: Wiley-Academy.

Government of Western Australia, 2007. Walk WA: A Walking Strategy for Western Australia. the Government of Western Australia: http://www.beactive.wa.gov.au.

Grimm, N. B., Faeth, S. H., Golubiewski, N. E., Redman, C. L., Wu, J., Bai, X., and Briggs, J. M. (2008). Global change and the ecology of cities. Science, 319 (5864), 756-760.

Gruebner, O., Rapp, M.A., Adli, M., Kluge, U., Galea, S., and Heinz, A., 2017. Cities and Mental Health. Deutsches Ärzteblatt International.

Guba, E.G. and Lincoln, Y.S., 1994. Competing paradigms in qualitative research. In: N.K. Denzin, et al., eds., Thousand Oaks, CA, US: Sage Publications, Inc, 1994, pp. 105-117.

Haider, J., 2007. Inclusive design: Planning public urban spaces for children. Proceedings of the Institution of Civil Engineers-Municipal Engineer, 160 (2), 83-88.

Hall, M., Ram, Y., and Shoval, N., 2018. The Routledge International Handbook of Walking. Abingdon: Routledge.

Hall, P., 1996. Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century Updated edition. Oxford, UK: Blackwell.

Hamdan-Saliba, H. and Fenster, T., 2012. Tactics and strategies of power: The construction of spaces of belonging for Palestinian women in Jaffa–Tel Aviv.

Hanafin, S., 2004. Review of literature on the Delphi Technique. Dublin: Department of Children and Youth Affairs.

Handy, S., Cao, X. and Mokhtarian, P., 2005. Correlation or causality between the built environment and travel behavior? Evidence from Northern California. Transportation Research: Part D, 10 (6), 427-444.

Hassan, A.M., Lee, H. and Yoo, U., 2014. Evaluation of the contemporary urban design through the classic urban theories: Cairo and Gwangju downtown as a case study. HBRC Journal, 10 (3), 327-338.

Hassan, M., 2015. Selection Process of Auto-ID Technology in Warehouse Management: A Delphi Study. Doctor of Philosophy., Brunel University.

Hasson, F., Keeney, S. and McKenna, H., 2000. Research guidelines for the Delphi survey technique. Journal of Advanced Nursing, 32 (4), 1008-1015.

Hayward, R., and McGlynn, S., 1993. Making Better Places Urban Design Now. First Ed. Linacre House, Jordan Hill, Oxford Ox2 8dp Uk: Elsevier Group.

Heath G.W., Brownson R.C., Kruger J., Miles R., Powell K.E., and Ramsey L.T., 2006. The Effectiveness of Urban Design and Land Use and Transport Policies and Practices to Increase Physical Activity: A Systematic Review. Journal of Physical Activity & Health, 3, S55-S76.

Højriis, J., Herrmann, I.T., Nielsen, P.S., and Bulkeley, P., 2014. A Comparative Study of Contextual Urban Design Approaches in the UK and DK. Third International Workshop on Design in Civil and Environmental Engineering,Technical University of Denmark, , 1-10.

Hsu, S.H., Chang, J. and Lee, C., 2013. Designing Attractive Gamification Features for Collaborative Storytelling Websites. CyberPsychology, Behavior & Social Networking, 16 (6), 428-435.

Hung, H., Altschuld, J.W. and Lee, Y., 2008. Methodological and conceptual issues confronting a cross-country Delphi study of educational program evaluation. Evaluation and Program Planning, 31 (2), 191-198.

Ilin, A., and Raiko, T., 2010. Practical Approaches to Principal Component Analysis in the Presence of Missing Values. Journal of Machine Learning Research, 11, 1957-2000.

Inam, A., 2002. Meaningful Urban Design:Teleological/Catalytic/Relevan. Journal of Urban Design, 7 (1), 35.

Inam, A., 2011. From Dichotomy to Dialectic: Practising Theory in Urban Design. Journal of Urban Design, 16 (2), 257-277.

Isaac, S., Michael, W.B., 1997. Handbook in Research and Evaluation. 3rd ed. San Diego: EdITS.

Ismail, A. and Elmloshi, A.E., 2011. Existing transportation scenario in Tripoli, Libya. Australian Journal of Basic and Applied Sciences, 5 (9), 1288-1295.

Ismail, A., and Elmloshi, A., 2011. Existing Transportation Scenario In Tripoli, Libya. Australian Journal of Basic and Applied Sciences, 5 (9), 1288-1295.

Jacobs A., and Appleyard, D., (1987) Toward an Urban Design Manifesto, Journal of the American Planning Association, 53:1, 112-120, DOI: 10.1080/01944368708976642.

Jacobs, J., 1961. The Death and Life of Great American Cities. first ed. New York: Random House.

James, K., 2001. I Just Gotta Have My Own Space!: The Bedroom as a Leisure Site for Adolescent Girls. Journal of Leisure Research, 33 (1), 71-90.

John, P. and Coleman, R., 2015. History of Inclusive Design in the UK. Applied Ergonomics, 46, Part B (0), 235-247.

Kahana, E., Lovegreen, L., Kahana, B., and Kahana, M., 2003. Person, Environment, and Person Environment Fit as Influences on Residential Satisfaction of Elders. Environment and Behavior, 35 (3).

Kaparias, I., Bell, M.G.H., Biagioli, T., Bellezza, L., and Mount, B., 2015. Behavioural analysis of interactions between pedestrians and vehicles in street designs with elements of shared space. Transportation Research Part F: Traffic Psychology and Behaviour, 30, 115-127.

Karim, H.A. and Azmi, D.I., 2013. Convenience and Safety of Walking Experience in Putrajaya Neighbourhood Area. Procedia - Social and Behavioral Sciences, 101, 318-327

Kasprisin, R., 2011. Urban Design: The Composition of Complexity. USA and Canada: Routledge.

Kastein, M.R., Jacobs, M., van der Hell, R.H., Luttik, K., and Touw-Otten, F.W.M.M., 1993. Delphi, the issue of reliability: A qualitative Delphi study in primary health care in the. Elsevier Science Publishing Company, Inc.

Kegler M.C., Alcantara I., Haardörfer R., Gemma A., Ballard D., and Gazmararian J., 2015. Rural Neighborhood Walkability: Implications for Assessment. Journal of Physical Activity & Health, 12, S40-S45.

Kegler, M.C., Alcantara, I., Haardörfer, R., Gemma, A., Ballard, D. and Gazmararian, J., 2015. Rural Neighborhood Walkability: Implications for Assessment. Journal of Physical Activity & Health, 12, S40-S45.

Kennedy, R.C., Xiang, X., Madey, G.R. and Cosimano, T.F., 2009. Verification and Validation of Scientific and Economic Models. In: October 2005. University of Notre Dame, pp. 1-15.

Kerr Z., Evenson K.R., Moore K., Block R., and Diez Roux A.V., 2015. Changes in walking associated with perceived neighborhood safety and police-recorded crime: The multi-ethnic study of atherosclerosis. Preventive Medicine, 73, 88-93.

Khondker, H.H, 2009. Dhaka and the contestation over the public space. City, 13 (1), 129-136.

Kim, S., Lee, Y.M. and Lee, E., 2013. The defensible space theory for creating safe urban neighborhoods: Perceptions and design implications in the United States and South Korea. Journal of Architectural and Planning Research, 30 (3), 181-196.

Kin Wai, M.S., 2010. Open for All: Open Spaces and New Urban Lifestyles. International Journal of the Humanities, 7 (12), 25-38.

Klenke, K., 2008. Qualitative Research in the Study of Leadership. UK: Emerald Group Publishing.

Koohsari M.J., Mavoa S., Villanueva K., Sugiyama T., Badland H., Kaczynski A.T., Owen N., and Giles-Corti B., 2015. Public open space, physical activity, urban design and public health: Concepts, methods and research agenda. Health & Place, 33, 75-82.

Koschinsky, J. and Talen, E., 2016. Location Efficiency and Affordability: A National Analysis of Walkable Access and HUD-Assisted Housing. Housing Policy Debate, 26 (4-5), 835-863.

Kostof, S., 2005. The City Assembled: The Elements of Urban Form Through History. London: Thames & Hudson.

Krenichyn, K., 2004. Women and physical activity in an urban park: Enrichment and support through an ethic of care.

Krier, R., 1979. Urban Space. First ed. London: Random House Incorporated.

Krueger, R.A., 1994. Focus Groups: A Practical Guide for Applied Research. Second ed. London: SAGE.

Kruger, J., Ham, S.A., and Ballard-Barbash, R., 2008. Prevalence of transportation and leisure walking among U.S. adults. Preventive Medicine, 47 (3), 329-334 6p.

Lakhder A., and Dugeny, F., 2010. Tripoli City Centre’s: Urban and Architectural Charter. Tripoli-Libya: Engineering and Consulting Office for Utilities and AKT / IAURIF GROUP.

Lang, J., 1994. Urban design: the American experience. New York: John Wiley & Sons.

Lang, J., 2005. Urban Design: a Typology of Procedures and Products Illustrated with over 50 Case Studies. First ed. Linacre House, Jordan Hill, Oxford OX2 8DP uk: Elsevier.

Leck, E., 2006. The impact of urban form on travel behavior: a metaanalysis . Berkeley Plan, 19, 37–58.

Lee, S. and Talen, E., 2014. Measuring Walkability: A Note on Auditing Methods. Journal of Urban Design, 19 (3), 368-388.

Lee, S., and Talen, E., 2014. Measuring Walkability: A Note on Auditing Methods. Journal of Urban Design, 19 (3), 368-388.

Leech, N.L.,. Barrett, K.C., and Morgan, G.A., 2014. IBM SPSS for Intermediate Statistics: Use and Interpretation, 5th Edition. Beaverton, United States Beaverton, Beaverton: Ringgold Inc.

Leinberger, C.B., and Alfonzo, M., 2012. Walk this Way: The Economic Promise of Walkable Places in Metropolitan Washington, D.C. BROOKINGS: D.C. Washington, .

Leslie E., Coffee N., Frank L., Owen N., Bauman A., and Hugo G., 2007. Walkability of local communities: Using geographic information systems to objectively assess relevant environmental attributes.

Levin, D.M., 1988. The Opening of Vision; Nihilism And The Postmodern Situation. First ed. New York and London: Routledge.

Lewis-Beck M., Bryman A., and Futing-Liao , 2004. The SAGE Encyclopedia of Social Science Research Methods. Thousand Oaks: SAGE Publications.

Listerborn, C., 2005. How public can public spaces be? City, 9 (3), 381-388.

Listerborn, C., 2009. Fear: Critical Geopolitics and Everyday Life. Urban Studies (Sage Publications, Ltd.), 46 (10), 2243-2245.

Litman, T.A., 2003. Economic Value of Walkability. Victoria Transport Policy Institute.

Littke, H., 2015. Planning the Green Walkable City: Conceptualizing Values and Conflicts for Urban Green Space Strategies in Stockholm. Sustainability, .

Livi, A.D., and Clifton, K. J, 2004. Issues and methods in capturing pedestrian behaviors, attitudes and perceptions: Experiences with a community-based walkability survey. Trb, .

Lo, R.H., (2009). Walkability: what is it? Journal of Urbanism: International Research on Placemaking and Urban Sustainability, 2(2), 145–166. http://dx.doi.org/10.1080/17549170903092867.

Lo, R.S.H., 2011. Walkability Planning in Jakarta. University of California, Berkeley.

LoBiondo-Wood G., and Haber, J., 2013. Nursing research in Canada: Methods, critical appraisal, and utilization. Toronto: Elsevier Mosby.

Loukaitou-Sideris, A. and Eck, J.E., 2007. Crime prevention and active living. American Journal of Health Promotion, 21 (4), 380-389.

Lukenangula, J.M.B., 2017. Walkability in Rapidly Growing Cities in Developing Countries: The Case of Dar es Salaam, Tanzania. TU Dortmund University.

Lynch k., and Hack, G., 1983. 3rd ed. Cambridge: MIT Press.

Lynch, K., 1960. The image of the city. Cambridge, Mass; London: MIT Press.

Mack, J., 2014. Urban Design from Below: Immigration and the Spatial Practice of Urbanism. Public Culture, 26 (1), 153-185.

Madanipour, A., 1996. Design of Urban Space An Inquiry into a Socio-spatial Process. Firat ed. West Sussex: JOHN WILEY & SONS.

Madden, K. and Schwartz, A, 2000. How to turn a place around : a handbook for creating successful public spaces. New York: Project for Public Spaces.

Malhotra, N.K., 2007. Marketing research: An applied analysis. 3rd ed. Landon: Harlow : Prentice Hall/Financial Times.

Mann, C.J., 2003. Observational research methods. Research design II: cohort, cross sectional, and case-control studies. Emergency Medicine Journal: EMJ, 20 (1), 54-60.

March A., Rijal, Y., Wilkinson S., and Özgür, E.F., 2012. Measuring Building Adaptability and Street Vitality. Planning Practice & Research, 27 (5), 531-552.

Marshall, M., and Rossman, G.B., 2015. Designing Qualitative Research. 6th ed. Landon: SAGE Publications.

Marshall, S 2012. Science, pseudo-science and urban design Urban Design International, 17 (4), 257-271.

McDowell, L., 1999. Gender, Identity and Place: Understanding Feminist Geographies. Minneapolis: University of Minnesota Press.

McKenna, H.P., 1989. The selection by ward managers of an appropriate nursing model for long-stay psychiatric patient care. Journal of Advanced Nursing, 14 (9), 762-775.

McKenzie, T.L., Cohen, D.A., Sehgal, A., Williamson, S., and Golinelli, D., 2006. System for Observing Play and Recreation in Communities (SOPARC): Reliability and Feasibility Measures. Journal of Physical Activity & Health, 3, S208-S222.

McKenzie, T.L., Marshall, S.J., Sallis, J.F., Conway, T.L., 2000. Leisure-Time Physical Activity in School Environments: An Observational Study Using SOPLAY. Preventive Medicine, 30 (1), 70-77.

McMillan, T.E., 2007. The relative influence of urban form on a child’s travel mode to school.

Mehta, V., 2008. Walkable streets: pedestrian behavior, perceptions and attitudes. Journal of Urbanism, 1 (3), 217-245.

Mehta, V., 2014. Evaluating Public Space. Journal of Urban Design, 19 (1), 53-88.

Melissa Mean and Charlie Tims, 2005. People make places: Growing the public life of cities, Public spaces programme. Demos.

Michael Larice, E.M., 2013. The Urban Design Reader. second ed. New work: Routledge.

Ministry of Health-Libya, 2009. National Survey of Non-Communicable Disease Risk Factors. Tripoli-Libya: Ministry of Health-Libya.

Mitra, A., and Lankford, S. V., 1999. Research Methods in Park, Recreation, and Leisure Services. United States: Sagamore Publishing.

Montero-Avila, M.I., 2001. Factors That Influence the Social Life and Vitality of Public Open Spaces in Maracaibo – Venezuela. Master of Landscape Architecture., University Seal.

Montgomery, B., and Peter Roberts, P., 2008. Walk Urban: Demand, Constraints and Measurement of the Urban Pedestrian Environment. Washington: World Bank.

Morgan, D.L., 1998. The focus group guide book. London: Sage Publications.

Moughtin, C., Moughtin, K.M., and Signoretta, P., 2009. URBAN DESIGN: HEALTH AND THE THERAPEUTIC ENVIRONMENT. First ed. Oxford, UK: Elsevier.

Moughtin, J.C, 2009. Urban Design: Health and the Therapeutic Environment. first ed. Oxford: Elsevier Ltd.

Moughtin, J.C., 2003. Urban Design: Street and Square. Third Edition ed. Oxford, UK: Elsevier's Science.

Moura, F., Cambra, P. and Gonçalves, A.B., 2017. Measuring walkability for distinct pedestrian groups with a participatory assessment method: A case study in Lisbon. Landscape and Urban Planning, 157, 282-296.

Muhlbach, J., 2012. Building Healthy Communities: Integrating Walkability Concepts into Local Land Use Planning. University of Nebraska.

Namin, E.R., Najafpour, H., and Lamit, H., 2013. Public Places and Spaces and Social Urban Interaction (A Case Study of Johor Bahru, Malaysia). International Journal of Current Engineering and Technology, 3 (2), 281-291.

Nantulya, V.M., Reich, M.R., 2002. The neglected epidemic: road traffic injuries in developing countries. Bmj, 324 (7346), 1139–1141.

Nasution, A.D. and Zahrah, W., 2012. Public Open Space Privatization and Quality of Life, Case Study Merdeka Square Medan.

Németh, J. and Hollander, J., 2010. Security Zones and New York City's Shrinking Public Space. International Journal of Urban & Regional Research, 34 (1), 20-34.

NUMBEO, 2017. Crime in Tripoli, Libya [online]. Numbeo. Available at: https://www.numbeo.com/crime/in/Tripoli.

Nyagah, P., 2015. A Multi-Procedural Approach to Evaluating Walkability and Pedestrian Safety. Doctor of Philosophy., University of Nevada.

NZ Transport Agency, 2009. Pedestrian planning and design guide. Wellington: NZ Transport Agency.

O'lear, Z., 2004. The Essential Guide to Doing Research. First ed. London: SAGE Publications.

Oxford University Press, 2017. Oxford University Press [online]. Oxford University Press.

Pallant, J., 2010. SPSS Survival Manual. 4th ed. UK: Open University Press.

Paulo, J.M.C., 2012. Pedestrian Accessibility and Attractiveness Indicators for Walkability Assessment. Instituto Superior Téchnico.

Payne, D.A. and Mcmorris, R.F., 1975. Educational and psychological measurement: contributions to theory and practice. USA: General Learning Press.

Payne, S., 2004. Who left it open? A description of the free answer question and its demerits. In Bulmer M. (Ed.) Questionnaires, 1, 131-147.

Pendakur, V.S., 2005. Non-Motorized Transport in African Cities Lessons from Experience in Kenya and Tanzania. . Sub-Saharan Africa Transport Policy Program Working Paper.

Petersen, A,. 1996. Dictionary of Islamic Architecture. first ed. New York,USA: Routledge.

Pieterse, E., and Parnell, S., 2014. Africa's urban revolution. London: Zed Books.

Pikora, T.J, Bull F.C., Jamrozik K., Knuiman, M., Giles-Corti, B., Donovan, R.J., 2002. Developing a reliable audit instrument to measure the physical environment for physical activity. American Journal of Preventive Medicine, 23 (3), 187-194.

Pont, K., Ziviani, J., Wadley, D., Bennett, S., Abbott, R., 2009. Environmental correlates of children's active transportation: A systematic literature review.

Pradinie, K., Navastara, A.M., and Martha, K.D.E., 2016. Who's Own the Public Space?: The Adaptation of Limited Space in Arabic Kampong. Procedia - Social and Behavioral Sciences, 227, 693-698.

Qureshi, S., Shaikh, J.M., and Memon, S.A., 2018. Residents's Subjective Assessment of Walkability Attributes in Objectively Assessed Neighbourhoods. Mehran University Research Journal of Engineering and Technology, 37 (3), 673-680.

Radford, A., 2010. Urban design, ethics and responsive cohesion. Building Research & Information, 4 (38), 379-389.

Rafiemanzelat, R., Emadi, M.I. and Kamali, A.J., 2017. City sustainability: the influence of walkability on built environments.

Rao, G.M., 1985. Prevalence of obesity in Libyan diabetic patients. Garyounis Med J, 8, 115-21.

Rapoport, A., 1987. Pedestrian Street Use: Culture and Perception. In: A. V. MOUDON, ed., Public Streets for Public Use. New York: Van Nostrand Reinhold Company Inc., 1987, .

Rehan, R.M., 2013. Sustainable streetscape as an effective tool in sustainable urban design. HBRC Journal, 9 (2), 173-186.

Reilly, D., 2015. Global Public Space Toolkit: From Global Principles to Local Policies and Practice. Kenya: United Nations Human Settlements Programme.

Remali, M., Porta, S., Romice, O., and Abudib, H., 2015. Street Quality, Street Life, Street Centrality. In: Laura Vaughan, ed., Suburban Urbanities: Suburbs and the Life of the High Street. London: UCL Press, 2015, pp. 104-129.

Rohrer, C., 2014. When to Use Which User-Experience Research Methods [online]. https://www.nngroup.com/articles/which-ux-research methods/ [Accessed October 28 2017].

ROSENAU, H., 1983. THE IDEAL CITY ,In its Architectural Evolution in Europe. first ed. LONDON AND NEW YORK: Routledge.

Rotmeyer, J., 2010. Publicness of elevated public space in Central, Hong Kong. Doctor of Philosophy., University of Hong Kong.

Rowley, A., 1994. Definitions of urban design: The nature and concerns of urban design. Planning Practice & Research, 9 (3), 179.

Saelens, B,E., Sallis, J.F., Frank, L.D., 2003. Environmental Correlates of Walking and Cycling: Findings From the Transportation, Urban Design, and Planning Literatures. Annals of Behavioral Medicine, 25 (2), 80.

Saelens, B.E., and Handy, S.L., 2008. Built Environment Correlates of Walking: A Review. Medicine & Science in Sports & Exercise, 40, S550-S566.

Salat, S., Bourdic, L., Labbe, F., and Salat, S., 2014. Breaking Symmetries and Emerging Scaling Urban Structures.

Sallis, J., Bauman, A. and Pratt, M., 1998. Environmental and policy interventions to promote physical activitya. American Journal of Preventive Medicine, 15 (4), 379-397.

Sallis, J.F. and Owen, N., 2002. Ecological models of health behaviour. In: Karen Glanz,Barbara K. Rimer and K. Viswanath, ed., Health Behaviour and Health Education: Theory, Research, and Practice. 3rd ed ed. San Francisco: Jossey-Bass, 2002, pp. 462-484.

Sallis, J.F., Saelens, B.E., Frank, L.D., Conway, T.L., Slymen, D.J., Cain, K.L., Chapman, J.E. and Kerr, J., 2009. Neighborhood built environment and income: Examining multiple health outcomes. Social Science & Medicine, 68 (7), 1285-1293.

Samur, F., 2013. The Townscape of Tripoli City During The Italian Colonial Period. Master., University of Tripoli.

Sandford, B.A. and Chia-Chien Hsu, 2007. The Delphi Technique: Making Sense Of Consensus. Practical Assessment, Research & Evaluation, 12, 1-8.

Sapawi, R. and Said, I., 2012. Constructing Indices Representing Physical Attributes for Walking in Urban Neighborhood Area. Procedia - Social and Behavioral Sciences, 50, 179-191.

Sarkar, S., 2003. Qualitative Evaluation of Comfort Needs in Urban Walkways in Major Activity Centers. Transportation Quarterly, 57 (4), 39-59.

Saunders, M., Thornhill A., and Lewis, P., 2009. Research Methods for Business Students. 3rd ed ed. London: Prentice Hall.

Sauter, D., and Huettenmoser, M., 2008. Liveable streets and social inclusion. Urban Design International, 13 (2), 67-79.

Sauter, D., and Tight, M., 2010. Measuring walking: Towards internationally standardised monitoring methods. Pedestrians' Quality Needs, Part B4, Documentation – Measuring walking. Daniel Sauter ed. Switzerland: WALK21, 2010.

Schlossberg, M., Agrawal, A.W., and Irvin, K., (2007). An Assessment of GIS-Enabled Walkability Audits. URISA Journal. Vol. 19, No. 2, pp. 5-11.

Schmeidler, K., 2008.Urban Planning solutions to improve pedestrian’s safety in urban areas. A Paper Present-Ed during 21st ICTCT.

Schurch, T.W., 1999. Reconsidering Urban Design: Thoughts about its Definition and Status as a Field or Profession. Journal of Urban Design, 4 (1), 5.

Schwandt, T.A., 1994. Constructivist, interpretivist approaches to human inquiry. In: N.K. Denzin, et al., eds., Thousand Oaks, CA, US: Sage Publications, Inc, 1994, pp. 118-137.

Seale, C., 2004. Researching Society and Culture. 2nd ed. London: Sage.

Sennett, R., 1977. The fall of public man. London: CUP Archive.

SEU (Social Exclusion Unit – UK Office of the Deputy Prime Minister), 2003. Making the Connections: Transport and Social Exclusion – Final Report. London: ODPM.

Shamsuddin, S., Hassan, N.R.A., and Bilyamin, S.F.I., 2012. Walkable Environment in Increasing the Liveability of a City. Procedia - Social and Behavioral Sciences, 50, 167-178.

Shawesh, E.M., 2000. The Changing Identity of The Built Environment In Tripoli City Libya. Doctor Of Philosophy In Architecture And Planning., University Of Newcastle Upon Tyne.

SHI, S., GOU, Z. and CHEN, L.H.C., 2014. How does enclosure influence environmental preferences? A cognitive study on urban public open spaces in Hong Kong. Sustainable Cities and Society, 13, 148-156.

Singh, R., 2016. Factors Affecting Walkability of Neighborhoods.

Siqueira Reis, R., et al., 2013. Walkability and Physical Activity: Findings from Curitiba, Brazil.

Siu, K.W.M., 2007. Guerrilla Wars in Everyday Public Spaces: Reflections and Inspirations for Designers.

Skulmoski, G.J., Hartman, F.T. and Krahn, J., 2007. The Delphi Method for Graduate Research. Journal of Information Technology Education, 6, 1-21.

Smith, A.D.L., 2008. The Relationship Between Neighborhood Environment and Walking Behavior: The Influence Of Perceptions. University of Maryland.

Smith, J.K., 1983. Quantitative versus Qualitative Research: An Attempt to Clarify the Issue. Educational Researcher, 12 (3), 6-13.

Soltani, L., Zangiabadi, A., Nastaran, M. and Mosayebi, S., 2014. Analyzing spatial inequalities regarding women’s benefiting from urban development indexes (case study: Urban districts of the city of Isfahan). City, Culture and Society, 5 (1), 43-49.

Song, H., Pan, M. and Chen, Y., 2016. Nightlife and public spaces in urban villages: A case study of the Pearl River Delta in China.

Sonmez Turel, H., Malkoc Yigit, E. and Altug, I., 2007. Evaluation of elderly people's requirements in public open spaces: A case study in Bornova District (Izmir, Turkey).

Southworth, B., 2003. Urban design in action: the City of Cape Town's Dignified Places Programme - implementation of new public spaces towards integration and urban regeneration in South Africa. Urban Design International, 8 (3), 119-119+.

Southworth, M., 2005. Designing the Walkable City. Journal of Urban Planning & Development, 131 (4), 246-257.

Stafford, M., Chandola, T. and Marmot, M., 2007. Association between fear of crime and mental health and physical functioning. American Journal of Public Health, 97 (11), 2076-2081.

Stanley, J., and Lucas, K., 2009. Special Issue of the Journal of Transport Policy focusing on International perspectives on transport and social exclusion. Transport Policy, 16 (3), 89.

Steiner, F., 1996. The Ecological City: Preserving and Restoring Urban Biodiversity; Urban Environmental Management: Environmental Change and Urban Design. American Planning Association.Journal of the American Planning Association, 62 (1), 125.

Steinø, N., 2004. Urban Design and Planning: One object – Two Theoretical Realms. The Nordic Journal of Architectural Research,Denmark, 17 (1), 63-85.

Sternberg, E., 2000. An integrative theory of urban design. American Planning Association.Journal of the American Planning Association, 66 (3), 265-278.

Sternberg, E., 2000. An Integrative Theory of Urban Design. Journal of the American Planning Association, 66 (3), 265.

Stockton, J.C., Duke-Williams, O., Stamatakis, E., Mindell, J.S., Brunner, E.J. and Shelton, N.J., 2016. Development of a novel walkability index for London, United Kingdom: cross-sectional application to the Whitehall II Study. BMC Public Health, 16, 416-416.

Sugiyama, T., Paquet, C., Howard, N.J., Coffee, N.T., Taylor, A.W., Adams, R.J. and Daniel, M., 2014. Public open spaces and walking for recreation: Moderation by attributes of pedestrian environments. Preventive Medicine, 62, 25-29.

Suhr, D.D., 2005. Principal Component Analysis vs. Exploratory Factor Analysis. University of Northern Colorado, , 1-10.

Talen, E., 2009. Urban Design Reclaimed. Planning, 75 (5), 38-41.

Talen, E., and Koschinsky, J., 2011. Is subsidized housing in sustainable neighborhoods? Evidence from Chicago. Housing Policy Debate, 21 (1).

Tandogan, O. and Ilhan, B.S., 2016. Fear of Crime in Public Spaces: From the View of Women Living in Cities.

Terlinden, U., 2003. City and Gender: International Discourse on Gender, Urbanism and Architecture. German: Verlag Leske+Budrich Opladen.

The Mayor of London and Transport for London, 2004. Making London a walkable city: The Walking Plan for London. London: Mayor of London&Transport for London.

Tian, G. and Ewing, R., 2017. A walk trip generation model for Portland, OR. Transportation Research Part D: Transport and Environment, 52, Part A, 340-353.

TRB/Transportation Research Board, 2005. Does the built environment influence physical activity? Examining the evidence – Special report. First ed. USA: Transportation Research Board.

Tridib, B., Loukaitou-Sideris, A., 2011. Companion to Urban Design. First ed. Oxfordshire, uk: Routledge.

Troy, A. and Grove, J.M., 2008. Property values, parks, and crime: A hedonic analysis in Baltimore, MD. Landscape and Urban Planning, 87 (3), 233-245.

Tulu, G.S., Washington, S., King, M.J., and Haque, Md.M., 2013. Why are Pedestrian Crashes so Different in Developing Countries? A Review of Relevant Factors in Relation to their Impact in Ethiopia. Australasian Transport Research, .

U. S. Department of Health and Human Services, 1996. Physical activity and health: A report of the Surgeon General. Atlanta: GA: Author.

United Nations Human Settlements Programme (UN-Habitat), 2013. State of the world's cities 2012/2013: Prosperity of cities. New York City: Routledge.

United States Department of Health and Human Services. (2002). Physical activity evaluation handbook. GA: Centers for Disease Control.

Urban Design Group, 2011. What is Urban Design? [online]. What is Urban Design. Available at: http://www.udg.org.uk/about/what-is-urban-design.

Van Dyck, D., Cardon, G., Deforche, B., Sallis, J.F., Owen, N. and De Bourdeaudhuij, I., 2010. Neighborhood SES and walkability are related to physical activity behavior in Belgian adults. Preventive Medicine, 50, Supplement, S74-S79.

Varna, G.M., 2014. Assesing the Publicness of Public Places: Towards a New Model. Doctor of Philosophy., University of Glasgow.

Vrij, A., and Willem, F., 1991. Characteristics of the built environment and fear of crime: A research note on interventions in unsafe locations

. Deviant Behavior, 12 (9), 203-215.

Walden, G.R., 2008. Focus Groups, Volume I; A Selective Annotated Bibliography: Art and Humanities, Social Sciences, and the Nonmedical Sciences. United States of America: SCARECROW PRESS, INC.

Walters D., and Brown, L.L., 2004. Design First, Design-based Planning for Communities. London, UK: Architectural Press.

Wall, E. and Waterman, T., 2010. Urban design. Lausanne: AVA Academia.

Wang, F., Wen, M. and Xu, Y., 2013. Population-adjusted street connectivity, urbanicity and risk of obesity in the U.S. .

Wansborough, M. and Mageean, A., 2000. The Role of Urban Design in Cultural Regeneration. Journal of Urban Design, 5 (2), 181-197.

Washburn, A., 2013. The Nature of Urban Design: A New York Perspective on Resilience. New York: Island Press.

Watkins, M.W., 2000. Monte Carlo PCA for Parallel Analysis. State College, PA. USA:

Whyte, W., 2001. The Social Life of Small Urban Spaces. New York: Project for Public Spaces Inc.

Whyte, W.H., 1980. The Social Life of Small Urban Spaces. first ed. Washington: Conservation Foundation.

Wood, L., Frank, L.D. and Giles-Corti, B., 2010. Sense of community and its relationship with walking and neighborhood design.

World Health Organisation (WHO). Regional Office for the Eastern Mediterranean, 2015. Road safety in the Eastern Mediterranean Region Facts from the Global Status Report on Road Safety 2015. Egypt: World Health Organisation (WHO). Regional Office for the Eastern Mediterranean.

World Health Organisation (WHO)., 2009. Global Status Report on Road Safety: Time for Action. Switzerland: .

Yahia, H.A.M., and Ismail, A., 2014. Knowledge of Traffic Laws and Drivers Behavior on the Roads of Tripoli City, Libya. Research Journal of Applied Sciences, Engineering and Technology, 7 (10), 2040-2045.

Yang, Y., 2008. A Tale of Two Cities: Physical Form and Neighborhood Satisfaction in Metropolitan Portland and Charlotte. Journal of the American Planning Association, 74 (3), 307-323.

Yin, K.R., 2013. Case study research: Design and methods. 5th ed. London: SAGE Publications.

Yung, E.H.K., Conejos, S. and Chan, E.H.W., 2016. Public open spaces planning for the elderly: The case of dense urban renewal districts in Hong Kong. Land use Policy, 59, 1-11.

Zacharias, J., Stathopoulos, T. and Wu, H., 2004. Spatial Behavior in San Francisco's Plazas: The Effects of Microclimate, Other People, and Environmental Design. Environment & Behavior, 36 (5), 638-658.

Zacharias, J., Stathopoulos, T., and Wu, H., 2001. Microclimate and downtown open space activity. Environment and Behavior, 33 (2), 296-315.

Zakaria, J. and Ujang, N., 2015. Comfort of Walking in the City Center of Kuala Lumpur. Procedia - Social and Behavioral Sciences, 170, 642-652.

Zakaria, J. and Ujang, N., 2015. Comfort of Walking in the City Center of Kuala Lumpur. Procedia - Social and Behavioral Sciences, 170, 642-652.

Zaqali, N.F.E., 2016. Evaluating Public Squares According To the Foundations of the World Organization for Projects of Public Spaces Case Study: Al-Shuhada Square. master., University of Tripoli.

Zenk, S.N., Wilbur, J., Wang, E., McDevitt, J., Oh, A., Block, R., McNeil, S. and Savar, N., 2009. Neighborhood Environment and Adherence to a Walking Intervention in African American Women. Health Educ Behav, 36 (1), 167-181.

Zukin, S., 2012. The social production of urban cultural heritage: Identity and ecosystem on an Amsterdam shopping street. City, Culture and Society, 3 (4), 281-291.

Zuniga-Teran, A.A., Orr, B.J., Gimblett, R.H., Chalfoun, N.V., Marsh, S.E., Guertin, D.P. and Going, S.B., 2017. Designing healthy communities: Testing the walkability model. Frontiers of Architectural Research, 6 (1), 63-73.

Appendix 1: First Email to Engage Expert for Choosing Walkability Elements in Libyan Context

Dear Expert,

I am a research student at the School of Architecture and Built Environment (Faculty of Science & Engineering at University of Wolverhampton, UK) undertaking a Ph.D. research; the main research aim to understand the concept of walkability in urban space in the contexts of Libyan cities and develop planning strategies for Walkability which are able to be used as design decision support tool to evaluate the performances of urban space. It is being undertaken under the supervision of Dr Mohamed Gamal Abdelmonem, Dr Gehan Selim and Professor Sabah Mushatat by the University of Wolverhampton. Determination of the principal factors that may affect in walkable urban space in Tripoli will be taken as part of my research. Therefore, you have been identified as an expert in one of the areas of interest that my research is covering from your work with relevant organizations and we will be gaining your thoughts and opinion in order to determination the dimensions and element for Walkability which are able to be used in Libyan's urban open space context.

Delphi method is similar to a focus group, except that it is conducted anonymously, and over the Internet. I am hoping to understand the insights of experts. The aim in this phase is to getting information from experts in the field. The 'expert' in this phase defined as someone who has expertise in the areas listed previously. I am estimating the survey will require one hour over 3-month period.

There are two rounds of online questionnaires to complete, with about a 15-day break in between each. The study would begin within a few days after you consent to take part. Also, this study is completely voluntary and confidential. If you don't want to participate, please feel welcome to let me know, and you will not be contacted.

If you are willing to participate, I need to let you know the following confidentiality safeguards and risks of the study, as determined by me and The University of Wolverhampton.

1. You will be asked to provide information over the Internet. It is possible that information provided over the Internet may be viewed by individuals who are not on my research team. I will use a secure website for the study questions.

2. I will use a study number and not your name to identify your responses. I will not collect your name or use any identifying information about you in the online study.
3. All information I collect from you will be kept in password-protected computer files.
4. After the study is completed, I will also ask if you would like your name included as part of the expert panel. These would be the only times your name would be identified as a participant.

If you have any questions about the research study itself, please contact me at M.A.Khairi@wlv.ac.uk &Khe772010@yahoo.co.uk. You may also contact my research supervisor, Dr. M.Gamal Abdelmonem, at m.gamal@wlv.ac.uk.

I would appreciate it greatly if you could confirm your decision to participate in my research.

Thank you very much for your consideration of my study. I'm looking forward to learning more about your expertise.

Sincerely,

Khairi Abdulla

Doctoral candidate

The University of Wolverhampton

Appendix 2: Delphi Study Round one Questionnaire

Delphi Study Round one Questionnaire: Determination of Walkable Dimensions and Selection of Case Studies Using Delphi Method

Dear Sir/Madam

REQEST FOR CHOOSING THE CASE STUDY AREAS WITH IN STUDY: THE USE OF WALKABILITY TO IMPROVE THE LIVEABILITY IN URBAN SPACES INSIDE TRIPOLI CITY CENTRE LIBYA.

To begin with let me take this opportunity to thank you very much for agreeing to participate in this phase of research. This letter invites you to participate in this Round one survey. The objective is to seek your expert opinion to ascertain the importance of a list of walkability dimensions and factors that may affects in Tripoli's public open spaces to by walkable and to select initial four case study areas. The survey should take about 15 to 20 minutes to complete, as most of the survey requires only a checkmark in the appropriate box. This questionnaire consists of three sections: section A requests information about your professional/working experience and contact information; section B. After each iteration consists of (8) dimensions and seventy eight (71) factors that affect the walkability in public open spaces which have been identified above through literature review in and section C aimed to select four case study areas in Tripoli. quantitative feedback report, including group analysis and comments, will be sent to you.

Khairi Abdulla

Libyan Phone Number: - 00218-92-4234847

M.A.Khairi@wlv.ac.uk &Khe772010@yahoo.co.uk

Pease answer all the following questions:

Section A: Information about you	
	Q1- The area of expertise Architecture ( ) Town planner ( ) Transport Planning ( ) Urban Design ( ) Landscaper ( ) Other (please specify)___________
	Q 2- Education level PhD ( ) Master ( ) Bachelor ( )
	Q 3- Where do you work? Tripoli University ( ) Tripoli Municipality planning ( ) Interests of Urban Planning ( ) Private sector ( ) Ministry of Housing and Utilities as policy maker ( )
	Q 4- Do you know about walkability? Yes ( ) Yes, I know a little ( ) No ( )
	Q5- how long have you been in this field? From 6-10 years ( ) from 11-15 years ( ) from 15-20 years ( ) From 20-25 years ( ) more than 25 years ( )
	Q5- Do you have any publications in this area? (public open spaces; walkability) Yes ( ) Yes, I know a little ( )

Section B:- Using the following list of factors please rate your top positive factors that may affects walkability in Tripoli open spaces.

A: Socio demographic Indicator Dimension		
Do you think these elements of (Accessibility Dimension) have an impact on walkability in urban space in Tripoli Libya?	Yes	No/ N/A
Age		
Gender		
Ethnicity		
Education level		
Employment		
Per capita income		
Health problem		
Auto ownership		

Please mention other Accessibility factors that that may effect in walkability in Tripoli's public open spaces: 1…………………………………………………………………………………………… 2.…………………………………………………………………………………………… 3.…………………………………………………………………………………………….			
B: Mixed Land Use Diversity Dimension			
	Do you think these elements of (Mixed land use diversity Dimension) have an impact on walkability in urban space in Tripoli Libya?	Yes	No/ N/A
	Residential		
	Commercial		
	Administrative and Government offices		
	Recreational		
	Please mention other Mixed Land Use factors that that may effect in walkability in Tripoli's public open spaces: 1…………………………………………………………………………………………… 2.…………………………………………………………………………………………… 3.…………………………………………………………………………………………….		
C: Accessibility Dimension			
	Do you think these elements of (Accessibility Dimension) have an impact on walkability in urban space in Tripoli Libya?	Yes	No/ N/A
	Number of footpaths		
	Availability of public transportation		
	Getting to bus stop		
	Number of significant barriers		
	Development patterns		
	Regional accessibility		
	Street connectivity (number of intersections within buffer)		
	Street pattern		
	Connectivity between uses		
	Number of bus services per day		
	Linkage of transport modes		
	Please mention other Accessibility factors that that may effect in walkability in Tripoli's public open spaces: 1……………………………………………………………………………………………		

	2.………………………………………………………………………………………… 3.………………………………………………………………………………………….		
D: Company Dimension			
	Do you think these elements of (Connectivity Dimension) have an impact on walkability in urban space in Tripoli Libya?	Yes	No/ N/A
	Walking with another person		
	Walking with pets		
	Number of relatives within the buffer		
	Please mention other connectivity factors that that may effect in walkability in Tripoli's public open spaces: 1.………………………………………………………………………………………… 2.………………………………………………………………………………………… 3.………………………………………………………………………………………….		
G: Pedestrian Facilities Dimension			
	Do you think these elements of Pedestrian facilities Dimension have an impact on walkability in urban space in Tripoli Libya?	Yes	No/ N/A
	Presence of bicycle way		
	Disability infrastructure		
	Availability of crossings		
	Feed bus service		
	Park or recreational facility		
	Street lighting		
	Open sewers along walking path		
	Street furniture		
	Quality amenities in public parks		
	Please mention other Mixed Land Use factors that that may effect in walkability in Tripoli's public open spaces: 1.………………………………………………………………………………………… 2.………………………………………………………………………………………… 3.………………………………………………………………………………………….		
H: Convenience & Comfort Dimension			
	Do you think these elements of (Convenience & Comfort Dimension) have an impact on walkability in urban space in Tripoli Libya?	Yes	No/ N/A

	This place generally free from litter and clean.		
	Variety of activities within buffer		
	Existence of public toilet		
	Walking path modal conflict		
	Ambient sound and air quality		
	Diversity of activities		
	Continuity of pavements		
	Pavement width		
	Childrens' playgrounds		
	Pavements maintained		
	Shelter for protection from the weather and the sun.		
	Vehicle parking facilities		
	Seating areas		
	Please mention other Mixed Land Use factors that that may effect in walkability in Tripoli's public open spaces: 1…………………………………………………………………………………………… 2.…………………………………………………………………………………………… 3.……………………………………………………………………………………………		
I: Safety Dimension			
	Do you think these elements of (Safety Dimension) have an impact on walkability in urban space in Tripoli Libya?	Yes	No/ N/A
	Personal safety		
	Risk of the crimes into this place		
	Reported crimes		
	Road accidents		
	Undesirable land use & activities		
	Abandoned buildings & lands		
	Safety: People present in roads		
	Vehicle speed and separating between pedestrians and vehicles		
	Crosswalks in the middle of the street		

	Enough street lighting		
	Level of visibility		
	Please mention other Mixed Land Use factors that that may effect in walkability in Tripoli's public open spaces: 1……………………………………………………………………………………… 2……………………………………………………………………………………… 3……………………………………………………………………………………….		
I: Aesthetic Dimension			
Do you think these elements of (Safety Dimension) have an impact on walkability in urban space in Tripoli Libya?		Yes	No/ N/A
Attractive architectural and building design			
Presence of street trees			
Number of places to exercise			
Variety in routes			
Narrow & crowded streets			
Landscaping treatments either side of road			
Naturally attractive places			
Availability of plazas			
Park intensity			
Visual quality			
Transparency of fronting structures			
Coherence of built form			
Please mention other Mixed Land Use factors that that may effect in walkability in Tripoli's public open spaces: 1……………………………………………………………………………………… 2……………………………………………………………………………………… 3……………………………………………………………………………………….			
Section C:- Case Study selection			
Could you select a highly walkable area (a public square or street) in Tripoli city centre with good walkability conditions?		1……………………	
Could you select a highly walkable area (a public square or street) in Tripoli city centre with poor walkability conditions?		2……………………	

Could you select poor walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?	3……………………
Could you select poor walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?	4……………………

ANY OTHER COMMENTS

____

____

____

Thank you for your co-operation and support.

Appendix 3: Delphi Study Round two Questionnaire

Second Round two Questionnaire

Determination of Walkable Dimensions and Selection of Case Studies Using Delphi Method

Dear Expert

You have successfully participated in the Round one to identify the dimensions and factors affects walkability in Tripoli's public open spaces. This letter invites you to participate in this Round two survey. This survey should take about 15 to 20 minutes to complete, as most of it requires only a checkmark in the appropriate box.

The Second Round of the Delphi survey is questionnaire to rank or rate the items according to the perceived importance within the walkability in Tripoli's public open spaces. The items will be ranked from (1) to (5) using a Likert scale by selecting (strongly agree, agree, neutral, disagree& strongly disagree).

Please be assured that all information collected will remain confidential and will only be used to calculate group averages. Your name, firm, school, or organisation will not be attached to any comments you provide. In addition, you will not be referred to by name or organisation in the feedback reports and research write-up.

Thank you very much and we look forward to hearing from you.

Yours sincerely,

Khairi Abdulla

Libyan Phone Number: - 00218-92-4234847

M.A.Khairi@wlv.ac.uk &Khe772010@yahoo.co.uk

Please rank the level of importance of the following Dimensions and factors that contribute to the assessment of the sustainability of residential neighbourhood layouts. Please use the following ranking scale when indicating your preference:

Ranking and Percentage Score Description			
1	Strongly disagree	Very: Low: 0-20%	Least affect in walkability
2	Disagree	Low : 20-40%	Below average affect in walkability
3	Neutral	Medium: 40-60%	Average affects in walkability
4	Agree	High: 60-80%	Important affects in walkability
5	Strongly agree	Very High: 80-100%	Extremely affects in walkability

Section B: Factors affecting walkability in Tripoli's public open spaces come out from Round One

Strongly disagree = 1, Disagree = 2, Neutral 3, Agree = 4 Strongly agree = 5

A: Socio-Demographic Indicator Dimension

	1	**2**	**3**	**4**	**5**
Age					
Gender					
Education level					
Health problem					
Auto ownership					

Any other comments

……
……
……………………………………………………

B: Mixed Land Use Diversity Dimension

Residential					
Commercial					
Administrative and Government offices					
Recreational					

Any other comments

……
……………………………………………………………………………………………………

C: Accessibility Dimension

Number of footpaths					

	Availability of public transportation					
	Getting to bus stop					
	Development patterns					
	Street connectivity (number of intersections within buffer)					
	Number of bus services per day					
	Linkage of transport modes					
	Any other comments …………………………………………………………………………………………………… …………………………………………………………………………………………………					
G: Pedestrian facilities Dimension						
	Disability infrastructure					
	Availability of crossings					
	Feed bus service					
	Park or recreational facility					
	Street lighting					
	Street furniture					
	Any other comments …………………………………………………………………………………………………… …………………………………………………………………………………………………					
H: Convenience & Comfort Dimension						
	This place generally free from litter and clean					
	Existence of public toilet					
	Ambient sound and air quality					
	Diversity of activities					
	Continuity of pavements					
	Pavement width					
	Childrens' playgrounds					
	Pavement s maintained					

	Shelter for protection from the weather and the sun.					
	Vehicle parking facilities					
	Seating areas					
	Any other comments ……… ……………………………………………………………………………………………………					
I: Safety Dimension						
	Personal safety					
	Risk of the crimes into this place					
	Reported crimes					
	Road accidents					
	People present in roads					
	Vehicle speed and separating between pedestrians and vehicles					
	Crosswalks in the middle of the street					
	Enough street lighting					
	Police presence in the street					
	People Carrying Weapons					
	Any other comments ……… ……………………………………………………………………………………………………					
I: Aesthetic Dimension						
Do you think these elements of (Safety Dimension) have an impact on walkability in urban space in Tripoli Libya?						
Attractive architectural and building design						
Presence of street trees						
Landscaping treatments either side of road						
Naturally attractive places						

Visual quality					
Any other comments ……… ……………………………………………………………………………………………………					

Section C: Case Study selection **Please select one from the case study areas have been listed in round one**		
Could you select a highly walkable area (a public square or street) in Tripoli city centre with good walkability conditions?	1 Martyrs Square	
	2 Algeria Square	
Could you select a highly walkable area (a public square or street) in Tripoli city centre with poor walkability conditions?	1 Al-Rasheed Street	
Could you select poor walkable area (a public square or a street) in Tripoli city centre with poor walkability conditions?	1 Omar Al-Mokhtar Street	
	2 Algeria Square	
Could you select poor walkable area (a public square or a street) in Tripoli city centre with good walkability conditions?	1 Algeria Square	
	2 Al-Suehaliy Square	

ANY OTHER COMMENTS

………
………
………

Will you be available for a brief follow-up confidential focus group?

Yes ☐

No ☐

Thank you for completing the questionnaire.

Appendix 4: Users Questionnaire

Questionnaire Survey for Users

This questionnaire is designed by a Research student from the University of Wolverhampton. The questionnaire is intended to collect information about the walkability in Tripoli urban open space.

Participating in the exercise is voluntary and participants may opt out at any point. Participants are also free to skip questions they do not wish to answer. The questionnaire will take less than 15minutes to complete.

All information given by participant will be confidential. The questionnaire will be administered and collected on the spot, however if participants decide to return it later, it can be sent directly to this email: m.a.khairi@wlv.ac.uk.

Questionnaire Survey For Users

Where are you now?			
Omar Al-Mokhtar Street ☐	Martyrs' Square ☐	Algeria Square ☐	Al-Rasheed Street ☐

Section 1: Socio-demographic information of the respondent on Urban Space:						
1	Gender	Male ☐		Female ☐		
2	Age	18-29 ☐	30-39 ☐	40-49 ☐	50-59 ☐	60^{+} ☐
3	Education Level :-	Elementary School ☐	Higher secondary ☐		Bachelor Degree ☐	Postgraduate ☐

Section 2 : Visit information of the respondent on Urban Space:					
1	What is the maximum length of time you spend to walk in this place?				
	30 minutes or less ☐	30 minutes to 1 hour ☐	More than 60 minutes ☐		
2	How often do you visit this place?				
	First time ☐	Every day ☐	Couple of times a week ☐	Couple of times a month ☐	Once a year or less ☐

Section 3: The Mean Barriers Prevent Users to Spend time for Walk and Re-Visit Public Open Spaces

Q3: Please use the scale to indicate how the following barriers affect walking and revisiting POS in Tripoli. A value of 1 will imply minor barrier while 5 implies factor is a major barrier to walk and re-visit the POS in the city.

Q3		**1**	**2**	**3**	**4**	**5**
1	It has no exclusive pathway for pedestrians					
2	The speed of traffic on most nearby roads is usually more than 25km/h.					
3	It has a high crime rate					
4	It is not well-lit at night					
5	It has few people walking at night, which makes me feel unsafe					
6	It has no pedestrian crossings lights to help me cross busy roads					
7	Shade is not available along the pathway and sitting areas (from trees, shelters, & buildings)					
8	It has no available facilities for doing different activities, such as sports equipment					
9	It has insufficient playgrounds and park or recreational facilities.					
10	It has no disabled facilities					

11	It has no car parking					
12	The pathway has major barriers, cracks, and other pavement condition issues					
13	It has no different facilities for sitting, eating etc.					
14	It has poor facades and poor building condition					
15	It has no a diversity in land use					
16	No enough different places for buying and selling goods					
17	Poor linkages to the majority places around Tripoli					
18	No public transportation available					
19	It is not clean and there are insufficient garbage baskets					
20	It has no naturally attractive landscape					
21	The pavements/paths are not well maintained					
22	**Please list other factors that could constitute barriers to walkability in this public open spaces** **1……………………………………………………………………………………………………** **2……………………………………………………………………………………………………**					

Section 4: Success factors affect in users to spend time for walk and revisit the POS

Please use the scale to indicate the following success factors that will affect spend time for walking and revisit the public open spaces: (1) strongly disagree (2) disagree (3) neither agree nor disagree (4) agree (5) strongly agree

Q4		**1**	**2**	**3**	**4**	**5**
1	Good links to other parts of the city by different types of public transportation, such as taxis and buses etc.					
2	Improve accessibility to the public spaces and other land use types, such as shops, public library, etc.					
3	Walkable public open space should have diverse social activities for different age groups					
4	Prevent traffic in some streets in the city centre, customized for walking					
5	Walkable public open space should have facilities for crossing the streets and reduce traffic speed in the vicinity					
6	Walkable public open space should be clear of trash					

7	More visible police presence					
8	Walkable public open space should have high quality architecture					
9	More attention to people's personal safety and security					
10	A public open space should have attractive views and elements, and soft landscaping such as green spaces and water elements					
11	Walkable public open space should have CCTV system					
12	Provide convenience & comfort facilities such as public toilet, shelter, car parking etc.					
13	Create more commercial activity around POS and create more mixed land use					
14	Walkable public open space should give people privacy by feeling boundaries between themselves and others					
15	Walkable public open space should have historical significance					
16	A public open space should include well-connected elements and give sufficient pedestrian moving opportunities					
17	Periodic maintenance of buildings and streets POS					
18	**Please list other success factors affect in users to spend time for walk and revisit the this public open spaces** **1.……………………………………………………………………………………………………** **2.……………………………………………………………………………………………………**					

ANY OTHER COMMENTS

Thank You for Being Part of My Research

Appendix 5: Professionals Questionnaire

Questionnaire Survey for Relevant Professionals

Dear Sir/Madam

I am a research student at the School of Architecture and Built Environment (Faculty of Science & Engineering at University of Wolverhampton, UK) undertaking a Ph.D. research; the main research aim to understand the concept of walkability in urban space in the contexts of Libyan cities and develop planning strategies for Walkability which are able to be used as design decision support tool to evaluate the performances of urban space. It is being undertaken under the supervision of Dr Mohamed Gamal Abdelmonem, Dr Gehan Selim and Professor Sabah Mushatat by the University of Wolverhampton. As part of my research I am undertaking a questionnaire based study exploring the current knowledge of walkable urban space in Libya. Therefore, you have been identified as an expert in one of the areas of interest that my research is covering from your work with relevant organizations and we will be gaining your thoughts and opinion in order to a develop planning strategies for Walkability which are able to be used as design decision support tool in Libya. It would be very much appreciated if you agree to take part and complete this important survey. This survey should take 15- 20 minutes to complete. Be assured that all answers you provide will be kept in the strictest confidential and the final results of the investigation will be obtainable upon your demand. Finally, we would like to thank you in advance for your kindly considerations and precious information. In completing the questionnaire you are consenting for your data to be used in the study. Please feel free to express yourself as much as possible, and you are free to discontinue your involvement at any time.

Khairi Abdulla

(Principal Investigator)

Phone Number; UK (00447481540503) - Libya (00218924234847)

M.A.Khairi@wlv.ac.uk &Khe772010@yahoo.co.uk

Section A:

A1- general information about you

1- *Experience*

0-5 years ( ), 6-10 years, 11-15 years ( ), 15-20 years ( ), 20-25 years ( ), 25 years+ ( )

2- *Organization*

Private sector ( ) Tripoli University ( ) Tripoli Municipality planning ( )

Interests of urban planning ( ) Ministry of Housing and Utilities as policy maker ( )

3- *Last educational qualification*
High school certificate ( ), Intermediate college diploma ( ), Bachelor degree ( ), Master degree ( ), PhD ( ).

4- *Please identify your level of knowledge of field related to public space*
Architecture ( ) Civil Engineering ( ) Landscape Architecture ( )
Urban Planning ( ) Transport Planning ( ) Urban Design ( )
Public Space Management ( )

A3: Using the scale 1-5 (5=excellent, 1=poor), could you point out how well you have done in carrying out walkable public space on (tick ☒correct response).

	1	2	3	4	5
5- Accessibility	☐	☐	☐	☐	☐
6- Pedestrian facilities	☐	☐	☐	☐	☐
7- Land use	☐	☐	☐	☐	☐
8- Aesthetics	☐	☐	☐	☐	☐
9- Safety and security	☐	☐	☐	☐	☐
10- Convenience & comfort	☐	☐	☐	☐	☐

11- Have you ever been asked about your opinion regarding to create walkable public spaces in your work?

☐Never ☐Once ☐Twice ☐Often

12- Do you find your experience of your field where you work (such as: architecture, retails, information, plazas, and walking spaces) is meaningful to you for design walkable public spaces?

☐Yes indeed ☐Yes ☐Not sure ☐No ☐ Not at all

13- How would you index your level of satisfaction with services provided in walkability by local authority?

very satisfactory	satisfactory	not sure	poor	very poor
☐	☐	☐	☐	☐

Section B Walkability policy and strategy

B1- Barriers affecting walkable public spaces in Tripoli

14- *Please use the scale to indicate how the following barriers affect walkability in Tripoli's public spaces? A value of 1 will imply minor barrier while 5 implies factor is a major barrier to walkability in city canter.*

	1	2	3	4	5
• Public open spaces are lack of maintenance and lack of development which makes walking in city centre very difficult.	☐	☐	☐	☐	☐
• Traffic volume and failure to enforce traffic regulations discourages walking in city centre.	☐	☐	☐	☐	☐
• Lack of public transportation discourages people from walking in city centre of Tripoli.	☐	☐	☐	☐	☐
• Public open spaces designers and Managers are poorly trained.	☐	☐	☐	☐	☐
• No a clear strategies and action from local authorities to encourage people to walk.	☐	☐	☐	☐	☐
• Knowledge of the benefits of walking are low in Libyan society.	☐	☐	☐	☐	☐
• Limited funds is make manage and development the public open spaces very difficult.	☐	☐	☐	☐	☐
• Local authority's and institutions are weak for management and implementation of public open spaces in Tripoli to be walkable.	☐	☐	☐	☐	☐
• Lack of strategies to improving safety and security such as control Vehicle speed, improve safety facilities for pedestrians, footway lighting, etc.	☐	☐	☐	☐	☐
• Failure to implement and enforce traffic laws poses a risk to users of Public Open Space.	☐	☐	☐	☐	☐
• Lack of landscaper and street furniture discourages walking in city centre of Tripoli.	☐	☐	☐	☐	☐

Please list other factors that could constitute barriers to walkability in public spaces in the city

1- ……………………………………………………………………………………………

2- ……………………………………………………………………………………………

B2- Walkability strategy (please tick - correct response)

15- How would you rate the effectiveness of current practice for managing and designing the public space to be walkable in Tripoli municipal?

☐ excellent ☐ good ☐ poor ☐ don't know

16- In your opinion who is best equipped to manage and design the public space to be walkable in the city:

☐ government agencies ☐ private organizations ☐ joint government and private

17- Please use the scale to indicate how the following success factors will affect designing and managing public open space to be more walkability in Tripoli:

A value of 1 will imply factor minimal effect while 5 implies factor has major effect.

	1	2	3	4	5
- Improve accessibility to public open space.	☐	☐	☐	☐	☐
- More attention of pedestrian facilities.	☐	☐	☐	☐	☐
- Create more mixed- Land-use.	☐	☐	☐	☐	☐
- More attention of aesthetic in city centre public open spaces.	☐	☐	☐	☐	☐
- More attention in safety and security.	☐	☐	☐	☐	☐
- Proved the convenience & Comfort facilities such as public toilet, sites,....etc	☐	☐	☐	☐	☐
- Future urban planning should be encouraging mass transit.	☐	☐	☐	☐	☐
- Creating a centralized organization for design and planning public open space.	☐	☐	☐	☐	☐
- Prevent traffic in some streets in city centre and customize it only for walkability.	☐	☐	☐	☐	☐

Please list other factors that could constitute success factors will affect designing and managing public open space to be more walkability in Tripoli:

- ………………………………………………………………………………………………………

………………………………………………………………………………………………………

Thank You for Being Part of My Research

Appendix 6: Observation Method

Observation Method

City		Survey area names		Road stretch	
Area type		Direction of the road		Date	
Number of people walking on the street		Women		Men	
Elderly people		People using wheelchair		People with sharpish	
People less than the age of 20		People crossing in pedestrian lines		Crossing in out of pedestrian line	
Section number in the map		Start time		Finish time	
People use the shops on the street		People use street just for walk by		Temperature	
People walking at average speed		People walk with kids		Car park on the street	
Bus use the street		Cars use the street		Numbers of vehicles	

Dimensions	**Factors**	(Observation)			Findings
		Number	Bad	Good	
Accessibility	Number of footpaths				
	Condition of footpaths				
	Number of significant barriers				
	Development patterns				
Safety	Personal safety				
	Number of crime watch signs				
	Road accidents				
	People present in streets				
	Vehicle speed limit				
	Enough street lighting				
	Level of visibility				
Convenience & Comfort	Cleanliness of the roads				
	Way finding signage				

Dimensions	**Factors**	(Observation)			Findings
		Number	Bad	Good	
	Walking path modal conflict				
	Ambient sound				
	Continuity and width of pavements				
	Paving treatment of pavement				
	Width of Home access road				
	Maintenance of walking path				
	Shade & cover from harsh climate				
	Vehicle parking facilities				
	Walking trail length				
Aesthetic and Pedestrian facilities Dimension	Presence of pavements				
	Disability infrastructure				
	Availability of crossings per road/ destination				
	Public park within neighbourhood				
	Street lighting				
	Street furniture				
	Attractive architectural design				
	Presence of street trees				
	Variety in routes				
	Naturally attractive places				
	Landscaping treatments either side of road				
	Availability of plazas				
	Residential				

Dimensions	**Factors**	(Observation)			Findings
		Number	Bad	Good	
Mixed land use diversity	Commercial				
	Educational & recreation				
	Administrative				
Convenience & comfort dimension	Cleanliness of the roads				
	Way finding signage				
	Walking path modal conflict				
	Ambient sound				
	Continuity and width of pavements				
	Paving treatment of pavement				
	Width of home access road				
	Maintenance of walking path				
	Shade & cover from harsh climate				
	Vehicle parking facilities				
	Walking trail length				
	Hot weather				
	Cold weather				
	Rainy weather				
	Mild weather				
	Dust weather				

Appendix 7: Focus Group for Experts

Focus Groups for Experts

Dear Sir/Madam

I am a research student at the School of Architecture and Built Environment (Faculty of Science & Engineering at University of Wolverhampton, UK) undertaking a Ph.D. research; the main research aim to understand the concept of walkability in urban space in the contexts of Libyan cities and develop planning strategies for Walkability which are able to be used as design decision support tool to evaluate the performances of urban space. It is being undertaken under the supervision of Dr Mohamed Gamal Abdelmonem, Dr Gehan Selim and Professor Sabah Mushatat by the University of Wolverhampton. As part of my research I am undertaking a focus groups based study exploring the current knowledge of walkable urban space in Libya. Therefore, you have been identified as an expert in one of the areas of interest that my research is covering from your work with relevant organizations and we will be gaining your thoughts and opinion in order to a develop planning strategies for Walkability which are able to be used as design decision support tool in Libya. It would be very much appreciated if you agree to take part and complete this **focus groups**. This focus groups should take about two hours to complete. Be assured that all answers you provide will be kept in the strictest confidential and the final results of the investigation will be obtainable upon your demand. Finally, we would like to thank you in advance for your kindly considerations and precious information. In completing the you are consenting for your data to be used in the study. Please feel free to express yourself as much as possible, and you are free to discontinue your involvement at any time.

Khairi Abdulla

(Principal Investigator)

Libyan Phone Number: - 00218-92-4234847

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Focus Group Technique

The technique was:

1. After welcomed participants, offered coffee and asked to fill out an informed consent form.
2. Participants have divided in two groups and each group was given two map of Tripoli and stationery (A4 papers, pencils, pens, highlighters, and removable stickers).
3. Before starting, the researcher have informed the group that an audio recording been made of the session and outlined confidentiality protocol.
4. Participants were asked to introduce themselves, their profession, and their work relevance to walkability.
5. Small exercise was given to the participants, exercise participants were requested to answer three questions:

   What do you know about walkable public open spaces?

   How walkable is The Tripoli city?

   what is list identified barriers that limited walking in Tripoli Libya?

   what is list identified success factors that can make Tripoli walkable city?
6. Participants were divided into two groups, each to look at current barriers discourage establish walkable public open spaces in Tripoli, also to strategies that adapt global best practises to local conditions.
7. The researcher have given participants a summary of what was discussed and asked them if they agree or if they feel anything has been missed.
8. The assistant researcher has raised items identified by the research team that were not discussed, and keep a checklist during the focus group discussion.
9. At the end of the focus group participants have been thanked for their participation.