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Understanding Walkability in the Libyan Urban Space: Policies, Perceptions and Smart Design for Sustainable Tripoli

A. Abdulla Khairi Mohamed, Mohamed Gamal Abdelmonem, Gehan Selim

***Abstract*—**Walkability in civic and public spaces in Libyan cities is challenging due to the lack of accessibility design, informal merging into car traffic, and the general absence of adequate urban and space planning. The lack of accessible and pedestrian-friendly public spaces in Libyan cities has emerged as a major concern for the government if it is to develop smart and sustainable spaces for the 21st century. A walkable urban space has become a driver for urban development and redistribution of land use to ensure pedestrian and walkable routes between sites of living and workplaces. The characteristics of urban open space in the city centre play a main role in attracting people to walk when attending their daily needs, recreation and daily sports. There is significant gap in the understanding of perceptions, feasibility and capabilities of Libyan urban space to accommodate enhance or support the smart design of a walkable pedestrian-friendly environment that is safe and accessible to everyone. The paper aims to undertake observations of walkability and walkable space in the city of Tripoli as a benchmark for Libyan cities; assess the validity and consistency of the seven principal aspects of smart design, safety, accessibility and 51 factors that affect the walkability in open urban space in Tripoli, through the analysis of 10 local urban spaces experts (town planner, architect, transport engineer and urban designer); and explore user groups' perceptions of accessibility in walkable spaces in Libyan cities through questionnaires. The study sampled 200 respondents in 2015-16. The results of this study are useful for urban planning, to classify the walkable urban space elements which affect to improve the level of walkability in the Libyan cities and create sustainable and liveable urban spaces.

***Keywords*—**Walkability, sustainability, liveability, accessibility, safety.

I. Introduction

THIS paper explores "walkable open space" in the Libyan context, the dimensions of urban space and effects on walkability in Libyan cities, especially in Tripoli. It examines the concept of walkability in outdoor open space spaces within the urban context of Libyan cities. Walkability and city design have both been studied for a long time, with notable works including The Life and Death of Great American Cities [1] followed by Cook [2], while Gehl [3] was the first researcher to use walkable street, street activity and city vitality as an index of successful and growing urban areas. Their approaches towards urban design of communities was not only Limited to the design of outside space shapes, but also the activities that happen there. Various studies acknowledge that the level of walkability and other physical activities is positively associated with specific open space design qualities. In the US, walking is the most common form of physical activity, with national estimates indicating roughly 42% of adults walk during leisure time and 28% walk for transportation purposes in intervals of at least 10 min [4]. At 49%, walking accounts for the second-highest proportion of all trips made in London, after driving, while national figures for walking and driving in the UK are 26% and 62%, respectively [5]. Child and Falconer [6] reported that improvements to public spaces can increase footfall and trading by up to 40%, with users of open spaces being more physically active if provided accessible, safe and attractive areas for exercise, as observed in some walkways used by residents of cities [7].

In some societies, the car is used for practically all journeys and it is the major consumer of fuel. Car dependency makes people unaware of the proximity between areas of living, working and shopping [8]. The result is the growing need for highways and parking provisions, and the encroachment on virgin land by urban sprawl. Comfort living and car use have together changed people's way of life. Nowadays, people spend most of their time indoors, walk less and use cars to move from one building to another [9]. Walking in the region of the Gulf Cooperation Council (GCC) has become almost impossible, not just because of the harsh weather conditions and the scorching heat in summer but also due to the outright dependence of the residents on the private automobile [10]. The absence of oversight led to the emergence of the poor open space 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 [11].

II. Definition of Walkability

It is necessary to explain from the outset what exactly is meant by walkability and walkable space. The concept of walkability has been used by many urban designers with relation to accessibility, comfort, proximity and suitability, but

A. Khairi M. A. Abdulla is PhD Candidate at University of Wolverhampton, School of Architecture & Built Environment, University of Wolverhampton; MI 228, City Campus, Wulfruna Street, Wolverhampton, WV1 1LY (e-mail: m.a.khairi@wlv.ac.uk).

B. Dr. M.Gamal Abdelmonem, PhD, M.Arch, BSc, PCHE, FHEA, RIBA, Senior Lecturer, Head of Digital Heritage Research Unit, School of Architecture & Built Environment University of Wolverhampton; MA109h, City Campus, Wulfruna Street Wolverhampton WV1 1LY (phone: (01902) 321162, fax: (01902) 322754, e-mail: m.gamal@wlv.ac.uk).

C. Dr Gehan Selim; BArch, MArch, PhD, AHEA, A-RIBA Lecturer in Architecture, Queens' University Belfast, David Keir, Building Room 0G.304, Stranmillis Road, Belfast. BT9 5AG (phone: +44 02890 974190, e-mail: g.selim@qub.ac.uk).

it is important to establish an operational definition for the purpose of this study. Jane Jacobs [1] described walkability as the core of urban vitality and vibrancy, the mixture of short blocks, density, land use mix and building types creating a "sidewalk ballet" in which the residents and visitors of the neighbourhood exist [1]. Walkability is often connected with suitability factors and variables such as pedestrian pathways, street furniture, street landscape (hard and soft), street width, safe speeds, crossing improvements and other pedestrian level-of-service and suitability factors [12].

"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 in terms of walking condition attributes such as convenience, comfort and safety [13]. Abley [14] defined 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 modern definition of walkable space. In policy terms, walkability has been understood as the extent to which walking is readily available as a safe, connected, accessible and pleasant mode of transport [5]. Southworth [15] defined it as the extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network.

The broad use of the term walkability is sometimes equated with the sustainable city, economic benefits, and providing social benefits, particularly in contexts where walkable spaces are the only access people have to healthy outdoor activities (e.g. in densely populated cities). Furthermore, walkable streets bring life to city centres and liveable streets contribute to safer urban environments. In transport terms, walkability is the most sustainable mode of transport with the least impact on the environment [16]-[19], namely an "accessible and affordable public transport service and safe infrastructure for non-motorized transport such as cycling and walking are lacking in most developing country cities" [20].

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III. Urban Public Open Space

In the last few years there has been growing interest in public open space in urban contexts, with numerous definitions of urban open space according to the perspectives involved. The term "public space" is generally understood as a "place" that is "public" and generally accessible and available for use. It is considered to be that space to which citizens of a polity have access and enjoy free right of use [23]. Chen et al. [24] describe public open space as a main component of urban space that caters to the urban public daily life.

At the policy level, the Scottish Executive [17] understands "public open space" to include any green-space of vegetated land or structure, water, path or geological feature, within and on the edges of settlements, while "urban space" consists of squares, market plazas and other paved or hard landscaped areas with a civic function. Mitchell & Popham [25] noted that in addition to aesthetic qualities, public open space promotes decreased mortality rates, particularly related to promoting public physical activities [26], while Nielsen & Hansen [27] noted that public open spaces reduce stress levels. Open spaces such as streets, parks, playgrounds, trails, and waterfronts are generally considered "public open spaces"; and they can offer local communities recreation settings in addition to various other environmental, social, health, and economic benefits [28], [29]. It can be concluded that there are three main factors related to the effective use of public open spaces, namely users' needs, the quality of the physical features and the spatial structure of the space [30]. Understanding users' needs is a cornerstone for any well-designed open space, and its design fundamentally attracts people, facilitates their activities and encourages them to spend more time using the space [31].

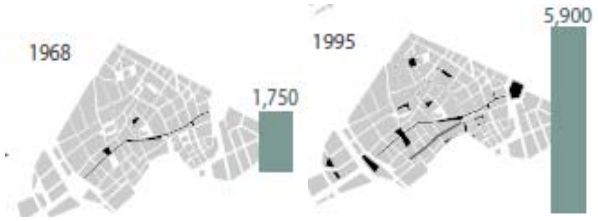
IV. The Street as a Public Space

The word "street" originates from the Latin of "strata", meaning a "paved road" [32]. According to the Oxford Dictionary [33], street is a public road in a city, town, or village, typically with houses and buildings on one or both sides. A Street is distinguished as being wider than an alley or lane but narrower than an avenue or boulevard. Conferring to Kostof [34], "the only legitimacy of the street is as public space, without it there is no city". Streets, squares and parks are the public open places of a city. In urban areas, streets constitute a significant part of the open public space and are seen as the most important symbols of the public realm [1], [35]-[40].

The common understanding of a street is a public space with residential houses, commercial buildings and other structures on one or each side; therefore, it entails social and economic functions that are integral to urban life [41]. Since the advent of the automobile, the function of streets has changed from being a multifunctional public space to being a traffic network that is non-functional in the traditional sense, which is the most consequential change seen in modern cities. The significant question that arises is what makes streets a good public space? According to Alan Jacobs [42], good streets tend to have narrow lanes (making them safe from moving cars), small blocks (making them comfortable), and architecturally-rich buildings (making them interesting). Intuitively, walking down a narrow, shop-lined street is a far safer, more comfortable, and more interesting experience than walking down an arterial route between parking lots.

The concept of walkable streets has been widely neglected during planning due to the absolute prioritisation of automobile traffic [43]. Indeed, modern roads are generally a physical barrier (to be spanned by arduous pedestrian bridges or the dreaded subway), causing noise and pollution in the heart of cities [44]. Promoting car-free streets in Europe and changes to pedestrian movement has enhanced city liveability [44]. According to Gehl [43], a single policy of increasing pedestrians and cyclists can certainly generate the interconnectedness between elements: liveability, safety, sustainability and health, as shown in Fig. 2.

Copenhagen is a good example of how promoting walkability can create liveable city space. It is considered as the first capital European city to prioritise walkability over traffic, with a major overhaul of urban planning during the 1960s in order to create a better environment for customers in the city's commercial centre. Copenhagen was the first European city to take serious steps towards to providing walkable space in its streets [45].



(a) (b)

Fig. 1 Average staying activates, summer days, noon – 4pm, Copenhagen city centre, (a) the activists in 1968, (b) the activists in 1995 [45]

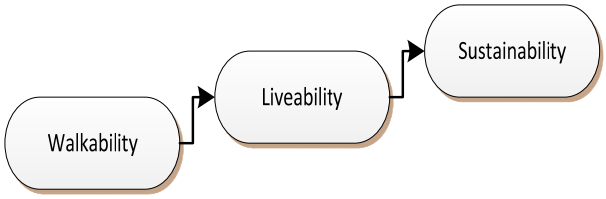


Fig. 2 Sustainability, Liveability and Walkability connection [46]

Tripoli is thousands of years old, and it is many advantages justifying its living and urban quality, but the city also faces many difficulties. Firstly, there is a manifest degradation of urban space, with green spaces further decreasing during the 2000s [46]. Roads and sidewalks are in bad condition and public space furniture is non-existent or heavily damaged. New projects with poor design and developing operations bring in architectural elements that harm the city's image [47]. Due to the on-going conflict since 2011, all projects are effectively stopped.

Fig. 3 Roads and sidewalks are in bad condition in OMS [5]

V. Walkable Street Factors

During recent years, the issue of rising walking and walkability of urban space has been raised by numerous scholars. Alfonso [48] established the hierarchy of walking needs, a theoretical model of the decision process in designing the walkable public open space, Fig. 4. It has been used as a framework in various recent studies, and Alfonso [48] wrote that "This model can (a) serve as a framework by which to understand the relative significance of the cornucopia of variables identified by existing research, (b) offer hypotheses for how these factors affect peoples' decision to walk, and (c) help to guide future research and practice".

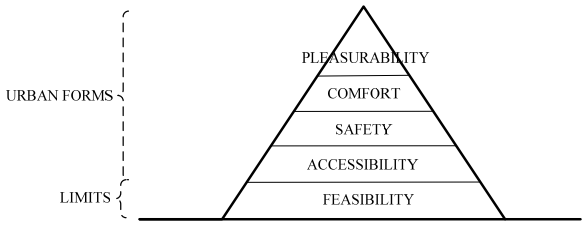


Fig. 4 The concept of hierarchy of walking needs [5]

Mehta [49] combined the perceptual element of Ewing and Handy's [50] conceptual model of the environment with an ecological model of walking behaviour that incorporated Alfonzo's [48] hierarchy of walking needs to make a comprehensive and complete model for a main street, Fig. 4. Informative models using socioecological perspectives to examine the link between physical activity and the built environment has been identified as optimal [51], [52] due to incorporating the functions of the extra-individual (social, physical and contextual) and intra-individual (personal and

behavioural) variables on behaviour outcomes [51]-[53]. Mehta's model comprises the accessibility and feasibility affordances of a trip consistent with Perceived Behavioural Control (PBC) as a determinant of behavior, Fig. 5 [54].

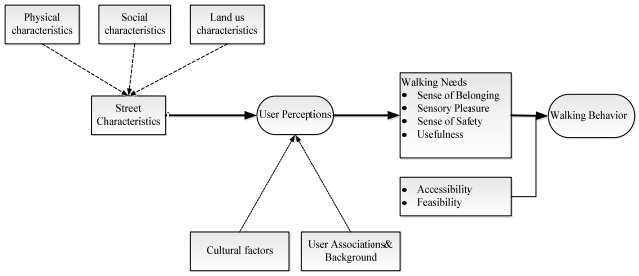


Fig. 5 Conceptual framework of walking needs on Main Street [49]

Makki et al. [55] argued that there are three factors of functionality for pedestrian networks: First, environmental factors such as connectivity, accessibility, safety, weather and terrain etc., second, personal factors such as age and health etc. Third, the visual interest along the path network, such as landscaping are affecting as final factors. Likewise, a walkable street has several of the following important factors: The connectivity of the path network, both locally and in the larger urban setting; linkage with other modes of transport (e.g. bus, streetcar and train); land use pattern (fine grained and varied, especially for local service uses); safety (from traffic and social crime); and the quality of the path (including width, paving, landscaping, signing and lighting) [15]. A Walking Strategy for Western Australia 2007-2020 [56] noted that in order to support the street environment to be walkable, there are five dimensions that need to be considered: Access and Accessibility: Creating an 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: The space should have a permeable level of flow or ease of access, regulated through physical barriers, convenience and accessibility to a landscape [57]. Aesthetics: The need to create an environment gives a pleasant experience in the location, by giving 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 crime. Pedestrians should be able to enjoy the trip in a relax fashion, in an environment maintained by adopting design principles that can prevent crime. 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 parameters indicate the smoothness of walking in a zonal scale, and the parameters are quite quantifiable. The fourth parameter is based on perception of local people based on some behavioural issues of travel. The last one is a micro-level approach for developing and strengthening the walking environment with appropriate instruments. These five parameters were used to analyses the situation of walkability and its prospects in Siliguri city.

VI. Research Methodology

A. Case Study Selection

Tripoli City 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 [5]. Tripoli has significant assets, specific in urban and architectural heritage as well as in urban planning and urban design. However, as a capital city Tripoli confronts important 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 etc. Furthermore, the city of Tripoli is separated from the sea (a natural open space) be the high speed coastal motorway that makes the crossing the road to the coast more dangerous [47]. Moreover, the regulations of land use applied since the 1990s preclude overcoming most of these difficulties. Many open spaces and streets which were for the pedestrians have been destroyed under these regulations [47]. Also, the crisis in Libya now has helped the rise of crime, as well as spread illegal phenomena, such as parking on pedestrian ways and selling merchandise in the street. Additionally, the lack of clear pedestrian's pathways from Martyrs' Square to Omer Al-Mukhtar Street, and the mix between the cars traffic and pedestrian movement, does not improve comfort of aesthetic enjoyment of the central area [58].

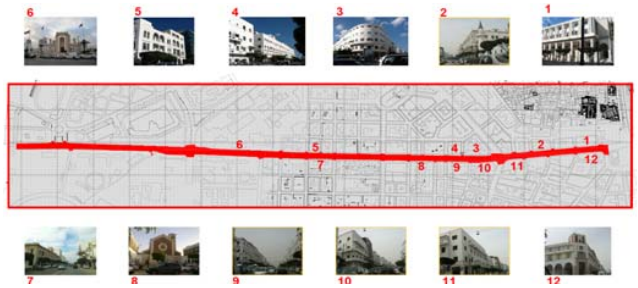
B. Omar Al-Moktar Street

Omar Al-Moktar Street (OMS) is located within the city of Tripoli on the coastline of the northern side of the city center, which is a one of the main streets in the city of Tripoli. From the city center (Martyrs' Square), OMS is approximately 5 km long and about 10 m wide. As Alzklaa [58] noted, the solid spaces in OMS are distributed regularly, giving a geometric shape around the central axis of the street, with a 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, Fig. 6.

(a)

(b)

(c)



(d)

Fig. 6 (a) Location of OMS, (b) Intersections on OMS, (c) High Buildings in OMS and (d) Landmark Buildings in OMS [5]

C. Why OMS

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 [59] Additionally, OMS is one of the largest streets in Tripoli, and also contains various activities which can potentially attract people to walk.

D. The Aim of This Paper

This paper plans to fill the gaps between prescribed characteristics of walkable urban space in Libyan cities and the design policies and guidelines for the design, management and perception of urban spaces in Libya. This is achieved by measuring the quality of streets as walkable public space in the city center of Tripoli and exploring the relationship between urban forms and walking, and how the built environment affects walking and physical activity by comprehending the condition of the street environment in relation to the research question: "How do different factors of the built environment affect pedestrian walking in OMS?"

E. The Method

A mixed method is used to achieve the aim of the study. As Alfonzo [48] elucidated, five aspects contribute to the walkable environment: Feasibility, accessibility, safety, comfort and pleasurability. Mixed methods, including two online surveys (administered via Survey Monkey) with experts (n=10) (town planners, architects, transport engineers and urban designers) and general users (n=187), were used to assess the validity and consistency of the main seven dimensions of walkable street design in Tripoli. The results from the expert survey were used to guide the development of the online survey instrument for users.

Phase 1: The Online Questionnaire for Experts

The validity and the consistency of seven dimensions and 51 factors that affect the walkability in open urban space in the Libyan context identified through literature review were ascertained by applying the Delphi technique with the online survey, the researcher used Tripoli University website's and Facebook to take the emails of the responders. A total of ten experts were selected, comprising randomly selected town planners, architects, transport engineers and urban designers who were engaged to refine the factors. Based on Delphi technique, the experts answered questions with justification by rounds, providing an opportunity for dynamic amendments and revisions. The multiple rounds, which were stopped after a pre-defined criterion was reached, enabled the group of experts to arrive at a consensus forecast on the most important factors that effect on walkable open space in Libya [60].

Phase 2: The Online Questionnaire for Street Users

As no previous work on this topic was identified in a Libyan context, the questionnaire was designed to measure walkable street characteristics in five parts.

- Part (a) General Information: Multiple-choice questions concerning participants' gender, age, time spent in walking, reason for walking, frequency and time of visiting the study area, original location, nature of transportation used to visit the study area, with whom they visited the study area and why they chose to visit the study area. This was to determine the class of the street users and why they use the street for walking.
- Part (b) Aesthetics and Activities: The question asked about the diversity of activities, visual quality, building, landscape and whether the street has shelter, litter, and trees or not. The purpose of the question is to determine why respondents are using the OMS.
- Part (d) Access to Services: With Yes, No or I don't know, this part of the questionnaire was designed to identify the user's opinion about the accessibility to the public service and if it in their decision to walk in this street.
- Part (c) Safety and Security: Due to the change happening in Libya since 2011, the safety and security become more important in Libyan streets. Based on that, this section is designed to know if the safety and security affect in the users' decision to walk through OMS, and spend more

time in walking. All survey results were imputed into the Statistical Package for the Social Sciences (SPSS) version 20.

- Part (e) Comforts and Pedestrian Facilities: The question in this part is designed in Likert scale to identify the most important elements of comforts and pedestrian facilities that affect in the users opinion to walk in the OMS, including sidewalks maintained, maintenance of the traffic signals, make sidewalks more wide, and the street furnishings and Landscape.

Phase3: Interviews Method

In-depth interviews were conducted from August 2016 to September 2016. Participants were asked to describe their judgment on the Omer Al-Moktar Street. They were prompted to talk about: 1) What they know about walkable street; 2) Types of issues and how they were addressed; 3) How they need the street to be; 4) The services which provided by local authority in the street.

VII. The Analysis

As a result of phase 1, four dimensions were found to affect walkable streets and open spaces in Libya: 1) Aesthetics and activities; 2) Access to services; 3) Pedestrian and walking facilities; and 4) Safety and security. For phase 2, a total of 187 valid responses were collected from the online survey. The sample included 55.08% males and 44.92% females. Over one-third (35.44%) were aged 26-35 years, followed by 29.44% aged 36-45 years, 20% aged 18-25, 8.33% aged 46-65, and 6.67% aged over 65

The reliability (Cronbach's alpha) [62] of the dimensions of walkable place was examined to ascertain the internal consistency of the items that constitute the dimensions. The reliability analysis was conducted by examining the total alpha of the subscales as well as examining the alpha if the items were deleted. Perfect alpha reliability score of the questionnaire reported for the amended measure should be more than .700; the reliability in this paper is (0.720).

TABLE I
Reliability Value Item

Reliability Statistics	
Cronbach's Alpha	N of Items
.720	33

The data analysis shows that, out of 200 questionnaires only 187 were used after incomplete or unreliable questionnaires were excluded. The current study found that (47.1%) of respondents went to the street at weekends; the distance between the house and the open spaces plays a particularly important role in walkable open space in Libya, as 74.9% of respondents go to open space from their own houses to visit the street. Also the results show that 55.1% of the respondents use their private cars to reach the street. The most interesting finding was that 87.04% of respondents used the car because the open space was far away from their houses. Safety and security is one of the factors that encourage people to experience the street by feet with 31.1% of respondents, while 25.7% of respondents walk in comfort open space.

As shown in Figs. 7 and 8, most frequent users who walked 5-10 minutes in Omer Al-Mokhtar Street were mostly males (18.18%) aged 18-25 years.

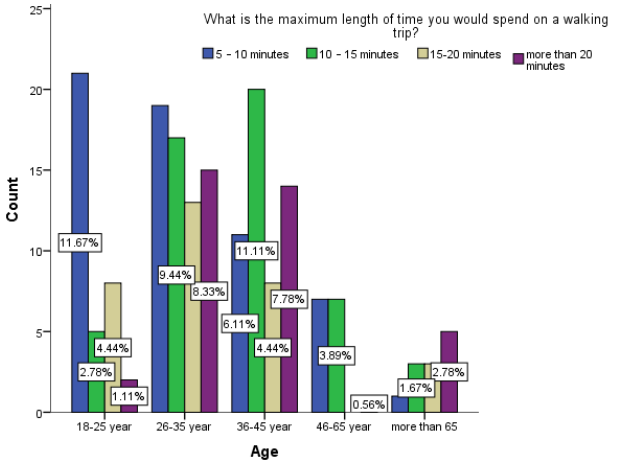


Fig. 7 Time of Walking and Age

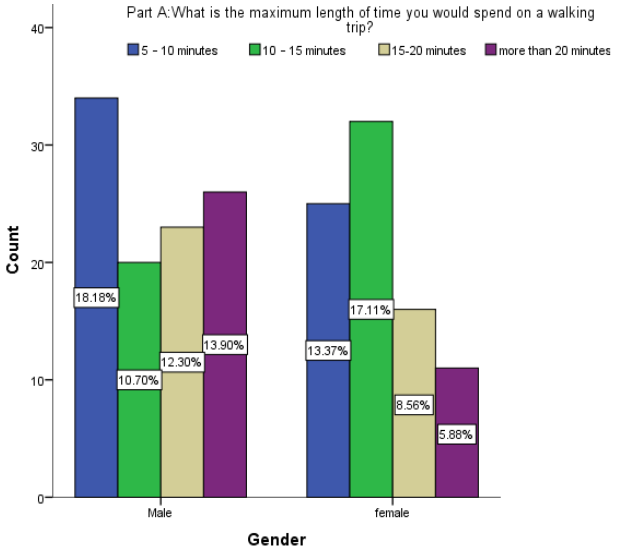


Fig. 8 Time of Walk and Gender

VIII. Discussion

A. Aesthetics and the Activities

As explained previously, its historicity and cultural importance make OMS one of the most important locations in Tripoli. As shown in Table II, the visual quality in OMS is acceptable for 38.8% of males and nearly half of female respondents. Of the 187 respondents who completed the questionnaire, 44.5% indicated that they are not satisfied with the diversity; moreover, 5 (0.5%) males and 57.1% of females were satisfied with the street being free from litter, Interestingly, more than 50% of the respondents were not satisfied with the trees and shelter for shading along the street. 26 of 30 interviewees indicated that they like to walk in this

street because of its diversity of activities and visual quality, while 27 of 30 people interviewed prefer to walk in the places free of litter and with beautiful landscape (i.e. not in OMS).

TABLE II
AESTHETICS AND THE ACTIVITIES

In this street, are you satisfied with …?		Gender	
		Male	Female
1: The diversity of activities	Satisfied	17.5%	31.0%
	Acceptable	34.0%	28.6%
	Not Satisfied	48.5%	40.5%
2: The visual quality	Satisfied	32.0%	40.5%
	Acceptable	38.8%	25.0%
	Not Satisfied	29.1%	34.5%
3: This street is generally free from litter	Satisfied	20.4%	22.6%
	Acceptable	29.1%	20.2%
	Not Satisfied	50.5%	57.1%
4: The building and landscape	Satisfied	28.2%	41.7%
	Acceptable	29.1%	14.3%
	Not Satisfied	42.7%	44.0%
5: Trees and shelter give shade for the sidewalks	Satisfied	21.4%	27.7%
	Acceptable	24.3%	28.9%
	Not Satisfied	54.4%	43.4%

B. Access to Services

The acceptability of high population density is well observed from the responses received from the users of OMS.

TABLE III
ACCESS TO SERVICES

Do you like to walk in this street because of …?		Gender	
		Male	Female
1: In this street it is easy to get into government and service offices	Yes	42.6%	57.8%
	No	46.5%	21.7%
	Don't know	10.9%	20.5%
2: In this street it is easy to get into restaurants/cafes	Yes	32.0%	56.0%
	No	59.2%	32.1%
	Don't know	8.7%	11.9%
3: In this street easy to get into retail stores or other shopping venues	Yes	46.6%	63.1%
	No	50.5%	28.6%
	Don't know	2.9%	8.3%
4: In this street it is easy to get into public transportation and bus stops	Yes	31.7%	39.6%
	No	53.5%	40.7%
	Don't know	14.9%	8.6%
5: In this street it is easy to get into parks or recreational facilities	Yes	19.4%	34.5%
	No	56.3%	44.0%
	Don't know	24.3%	21.4%
6: In this street it is easy to get into car parking	Yes	33.0%	26.2%
	No	50.5%	72.6%
	Don't know	16.5%	1.2%

Table III shows that 57.8% of female respondents had no complaint about access to the government office, while 46.5% of male respondents replied negatively about the access to the Government office and said it is "not easy to access". In addition, 53.5% of males and 40.7% of females do not like to walk in OMS because the lack of public transportation. However, the interview results showed that users of OMS suffer from the lack of the public transportation in Tripoli Libya. The study found that the accessibility in the street lack in terms of continuity and directness, thus necessary improvement should be considered.

C. Safety and Security

It is argued that users who perceive the lack of safety in public open space may feel unable to access facilities and partake in their places [5]. This section focused on the exploration of the meaning of "Safety Street" in this context by investigating safety and security issues in OMS and how they affected walkability. Table IV shows that most users felt safe during the day in OMS. As Table IV shows, 46.5% of respondents said that walking in the OMS during the day time is considered safe, while 47.6% of female respondents and 42.3% of male respondents thought that more separation between pedestrians and vehicles for walking would be more safe.

TABLE IV
ANALYSIS OF SAFETY AND SECURITY ITEM

In this street, do you feel safe?		Gender	
		Male	Female
1: Walking during the day	Yes	46.6%	46.4%
	No	28.2%	38.1%
	Don't know	25.2%	15.5%
2: Walking with separation between pedestrians and vehicles	Yes	42.3%	47.6%
	No	28.9%	42.9%
	Don't know	28.9%	9.5%
3: Walking if there are crosswalks in the middle of the street	Yes	52.0%	56.0%
	No	38.2%	29.8%
	Don't know	9.8%	14.3%
4: Walking during the night	Yes	31.1%	42.9%
	No	53.4%	54.8%
	Don't know	15.5%	2.4%
5: With good street lighting during the night	Yes	56.3%	51.2%
	No	30.1%	28.6%
	Don't know	13.6%	20.2%
6: If there is no manifestation of carrying weapons	Yes	49.5%	63.1%
	No	25.2%	20.2%
	Don't know	25.2%	16.7%
7: If the police are present in the street	Yes	60.2%	63.1%
	No	22.3%	32.1%
	Don't know	17.5%	4.8%

Nearly 53% agreed that they feel safe to walk if there are crosswalks in the middle of the street. Because of the security problems in Libya, almost 55% of respondents did not feel safe on the street at night time. In the same way, more than 66% said they would feel safer if there was no manifestation of carrying weapons, and 63% indicated that they would feel safer with a police presence in the street. This was reflected in the interview findings, with 25 from 30 people stating that they like walking in OMS during the day because the street is busy and active, which makes them feel safe from crime. Furthermore, 23 from 30 through that since the Revolution of 2011 crime has risen in Libya, thus most people avoid going outside in general.

D. Comforts and Pedestrian Facilities

The aspect of comfort and pedestrian facility was included

in the questionnaire survey. All 187 respondents were content about the space provided in pedestrian walkways throughout the OMS. However, as shown in Table V, 50.5% of females and 57.1% of male were dissatisfied with walkaway condition, thus urgent maintained should be considered. More than half of the respondents (72.9%) agreed that maintenance of the traffic signals could make the street more walkable. In answer to the fourth item "make sidewalks wider", generally more women agreed, possibly due to cultural factors. Most people thought that OMS needs more attention to street furnishings and the landscaping.

TABLE V
COMFORTS AND PEDESTRIAN FACILITIES

In your opinion, to be more walkable this street should take care of?		Gender	
		Male	Female
		Column N %	Column N %
1: Sidewalks maintained	Strongly Disagree	15.5%	20.2%
	Disagree	19.4%	17.9%
	Somewhat	14.6%	4.8%
	Agree	31.1%	34.5%
	Strongly Agree	19.4%	22.6%
2: Maintenance of traffic signals	Strongly Disagree	19.4%	15.5%
	Disagree	12.6%	10.7%
	Somewhat	14.6%	16.7%
	Agree	40.8%	32.1%
	Strongly Agree	12.6%	25.0%
3: Make sidewalks wider	Strongly Disagree	7.8%	9.9%
	Disagree	25.5%	14.8%
	Somewhat	17.6%	7.4%
	Agree	27.5%	56.8%
	Strongly Agree	21.6%	11.1%

IX. CONCLUSION

The main task of urban planners in Libya with regard to OMS is clear: To identify how to increase walking, accessibility, safety and comfort with an effective strategy. The findings indicate that pedestrian's level of workability depends not only on built environment factors only but also on feelings of safety and security as well as many complex considerations for user comfort. The most important consideration for the success of walkable street is to provide a high quality pedestrian facility such as the street landscape (trees, traffic signals and street furniture). Moreover, the extraordinary conditions under which this study was conducted (i.e. the on-going conflict since 2011) means that insecurity and the lack of availability of police on the streets, with the spread of crime, and absence of respect for the law exacerbated such problems beyond what one would expect under normal circumstances. This paper has argued that a combination of safety, access, comfort and the quality of pedestrian facilities is important for walkable streets. The lack of pedestrian facilities, car parking, street landscape, diversity of activities, and lighting in the street at night comprise a major barrier preventing people from walking in OMS. The other outcomes of this study indicate that the existence and condition of pedestrian ways in addition to the ways in which they are used are useful for city design professionals to classify the walkable urban space elements which improve the level of walkability in the Libyan cities to improve their sustainability and make them more liveable.

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