Livable Streets Determinants in Egypt: A Study on Streets' Physical Attributes in New Urban Communities

Aly Elkhashab

Abstract

One of the most integral parts of urban landscape and transit infrastructure in cities is city streets. City streets/streets are widely known for their significance as a medium for urban transit and commuting and also act as part of the public realm, where people usually gather to fulfill their social needs and aspirations. Lately, urban planning disregarded the secondary role of streets as public spaces and as a catalyst for public life. This was mainly driven by rising pressure on urban planning to accommodate the increasing number of new vehicles going road daily, crowding the already congested streets. Recently, urban planning acknowledges the significant role of streets in maintaining the city's vibrant and lively atmosphere. Several recent studies shifted focus toward traffic management and began regarding it as a key determining factor of streets' livability. However, research addressing people's perception of physical qualities and attributes with regards to their impact on the livability of streets tends to separate. This study examines the understanding of people to physical attributes of Egypt's streetscapes and is built on reviewed literature from 1980 to 2020 for the most recognized and referenced urban space architecture. Questionnaires and observations were used to define the main factors affecting street livability in two chosen multifunctional streets. About 15 physical attributes of streets were recognized and evaluated from reviewed literature, questionnaires and site observation. Accordingly, the proposed study will explore how the provision of basic facilities such as paving, roads, maintenance, cleaning, parking space and traffic lights will affect streets' livability. The final outcome of this study can be utilized by practitioners and policymakers in Egypt, to provide a more holistic understanding of key factors affecting the livability of streets in new urban settlements.

Keywords

Livable streets • Streets' physical attributes • Determinants of livability • City streets

1 Introduction

Streets occupy 25–30% of all urban developed land areas (Jacobs, 1993); hence, they are an important part of the landscape and users' daily life (Bohl, 2002) and serve as places of public expression (Leinberger, 2008). It is safe to say that the experience/environment that a street creates has a direct relation to the quality of urban life by means of its form function and organization within the community. Thus creating better streets would ensure a pleasant urban experience/environment to be developed.

Architects, urban planners and designers have continuously contributed to the significance of streetscape's physical attributes in creating a vital/livable surrounding environment and promoting local amenities. Studies showed that streets are a fundamental element of the overall built environment and are considered to be crucial elements of the public realm (Jacobs, 1961). Although Jacobs and Appleyard (1987) developed the livability definition almost 50 years ago, it was implemented as a consequence of several research works in the last 20 years on various aspects of post-modern cities and criticized numerous urban space problems such as toxic, noisy, dirty, poor quality and unwelcoming environments (Hartanti, 2012).

To tackle these issues for improving and humanizing the open spaces in modern cities, the concept of livability as a vital objective for creating a good urban setting was defined by several experts. Livable space was conceptualized as:

A. Elkhashab (✉)
Department of Architecture, Faculty of Engineering, Arab Academy for Science Technology & Maritime Transport, Smart village, Cairo, Egypt
e-mail: alielkhashab22@gmail.com

C. Piselli et al. (eds.), *Innovating Strategies and Solutions for Urban Performance and Regeneration*, Advances in Science, Technology & Innovation, https://doi.org/10.1007/978-3-030-98187-7_8

- The ideal street has to play as a safe sanctuary, giving a healthy, green, and pleasant environment, become a neighborhood territory that engages the community, become a place for play and learning for the children and have a unique quality that becomes the place identity (Appleyard, 1981).
- The eight characteristics of a good street as illustrated by Jacobs (1995) refer to livable street, i.e., a place that affords for people to walk with some leisure, affords physical comfort, clear definition, eyes-catching quality, transparency between inside and outside, complementarities in building design, good maintenance and good quality of construction and design.
- Livable spaces are places that attract all strata and classes (rich and poor, educated and uneducated), suit all ages (children, youth and elders) and encourage various activities. The livable spaces are affordable to all people, easily accessible and connected to the surrounding neighborhoods. They are available to all people, irrespective of their racial background, age, or gender. They provide a forum for individuals and society to be democratic. They have gathering spaces and foster socialites. Livable spaces form an area's cultural identity and provide a place for local communities (Zalloom, 2017).
- In the lifeless spaces, people who live and work in a given area are left without a place to interact in an informal, pleasant environment, and the people who pass through lose the possibility to experience a unique sense of place (Places, 2017).

So, the concluded aspects gathered up could be: Livable space is considered to be a safe and healthy space, where everyone can live in relative comfort. Also, it is a place that encourages the community to engage freely and offers a well-managed environment (green, healthy and pleasant) to people that is well maintained. It should be affordable for all people (different classes, ages and ethnic origin) and encourage various activities. Also, it acts as a place for play and learning for children and has a unique quality that becomes the place identity.

Almost all of the cultural, spiritual, com-mutual, physical and recreational activities take place in commercial streets throughout the neighborhood (Mehta, 2014). Livability has been strongly associated with streets that tackle the above-mentioned problems and fulfill community needs and serves the public needs for recreational activities (Francis, 1991) and (Gehl, 2001). This research aims to define livable streets determinants in Egypt by analyzing streetscapes physical attributes in two multifunctional streets in new urban cities, known as El Mostakbal street and El Bostan street, both located in Sheikh Zayed City. Questionnaires and structured observations will be used to examine society's perception and attitudes to streets' physical attributes and their effect on street livability which will be discussed later on.

2 Literature Review

Appleyard (1981) explained the concept of "livable streets" through his popular book "livable streets". This book introduced the approach of traffic calming in various cities worldwide toward a friendlier urban environment against a rapid increase in the number of vehicles in cities. Appleyard and Lintell (1972) addressed the harmful/negative traffic effects on decreasing inhabitants/citizens' quality of life, based on the "livable street" project in 1969. Traffic speed and traffic noise were the main factors with a great impact on the livability of the surrounding environment.

In 1982, Kaplan & Bush argued that a city-dweller appreciates "green" places more. In addition to efficiency of urban open spaces in providing a user friendly environment to get away from urban chaos, road congestion and overloading. Hartig et al. (1997) and Kaplan & Bush (1982) discovered evidence of relaxing and rehabilitative powers for human beings in natural scenes.

In 1985, urban open space was defined by Jackson as an urban form that brings people together through passive enjoyment. Also in the early 1980s, Lynch took the view that urban open space includes elements/attributes intended to engage groups of people and foster meetings. Urban open space has been distinguished from sidewalks by asserting that the first is a space on its own, instead of just an area to cross (Marcus & Francis, 1998).

J. Davis (2002) indicated that streets determine the character of a city. But often due to poor management and preservation, these streets let us down. Street clutter erodes an area's distinctive identity, importance and distinguishability. Such urban clutter is simply a product of the insufficient and sometimes distracting knowledge provided by the existing policy guidance to urban designers. These single-issue guides tend to take a detailed perspective of the urban streetscape thinking about whether a qualified engineer should be present to manage the overall image and integrate overall requirements.

In 2009, Collins and Shantz stated that city streets, public gardens and squares have always been crucial spaces for either community activities, economic or political ones. They act as places/hubs of interaction where societal customs may take place. Also, they express the norms of their society in many collective activities that may occur, either in the context of everyday life or in special/relatively frequent events, such as festivals and public events (Carr et al., 1992).

Nevertheless, streets are designed as places for traffic in the modern, post-industrial and contemporary conceptualization of space.

In (2005), characteristics of livable streets were examined by Dumbaugh and Gattis in correlation to street safety. Streets are defined as motorist thoroughfares; commercial streets also double as public gathering areas for residents and visitors. In urban streets people can shop, communicate, socialize and participate in different social and leisure activities that make urban living enjoyable. Findings revealed that the livability proponents support the installation of street trees, landscaping, attractive street lights and other roadside installations along the edge of the vehicles traveling routes, both to improve the esthetic attractiveness of a street and physically protect pedestrians from potentially hazardous oncoming traffic.

Sauter and Huettenmoser (2008) studied and evaluated five streets regarding the effects of the amount of traffic on the quantity and quality of street life in Basel, Switzerland. It was found that quieter streets are attaining a better community life. Park (2008) also concluded that calming traffic can have great effects on street walkability, as well as encouraging people to walk too.

Forsyth et al. (2008) found out that urban planning proposed that improving mobility in central neighborhood areas such as commercial streets could make urban lifestyles healthier, safer, cleaner and undoubtedly better and more efficient. Moreover, studies showed that ease of mobility (accessibility) improves streets' quality and livability (Jacobs, 1961), and also asserted that improving streets' physical attributes such as roads pavement, shelters (shading devices), lighting elements and aesthetic values facilitate walking and sports/outdoors activity, hence encouraging streets' walkability and establishing a more sustainable, healthy and livable environment (Rehan, 2013). Dumbaugh and Gattis (2005), Portella (2007) and J. Davis (2014) stated that commercial signage is classified as street clutter, and those physical details of streets affect the perception of users of community identity and sense of belonging. Layne (2009) has highlighted that social space of a street could be enhanced by adequate landscape design, and also facilitates generational engagement as well as promotes social interaction.

Mackett et al. (2008) created an app for assessing handicapped accessibility to the environment and investigated the details of the streetscape, including road crossing challenges and entrances to buildings. They noticed that modifications to such details have an effect on street use, improved access to handicapped facilities and encouraged street livability.

Hartanti, N. B. (2012) explained that originally streets are not designed as thoroughfares for the vehicle only. Streets, in fact, double function as public spaces. People usually get to use streets either to stroll/walk, shop, interact, or engage in a variety of social and recreational activities which make urban living enjoyable for users. So, the concept of street design has to be changed from creating more road bays struggling to catch up with the rapid growth in the number of vehicles. In an attempt for making space for people, whether on foot or by automobile, that is the livable street. Street livability is defined primarily by better integration of the interests and safety of pedestrians with the mobility of vehicles in conjunction with land use and activity. Gössling (2020) and Abdel-Aziz et al. (2020) highlighted the increasing availability of cars flooding on the city streets, as well as their detrimental effects on biodiversity and quality of life, leading to increased traffic congestion. In addition to psychological and social costs, it results in both time and cost losses. Also, an increase in emissions and rising energy consumption for automobiles had detrimental effects on air quality.

Tawil et al. (2014) studied El Medina street in the West Amman case, either the challenges it faces or the solutions needed to resolve the absolute occupation of traffic by converting it into a pedestrian-friendly street. As a consequence, strategies were introduced to reclaim traffic space as people's space, develop new street concepts in Jordan and divert congested routes into local ones. All of the previous are recommended concepts with more public spheres that can steer the development of streets in Amman.

According to Appleyard B. (2017), livable streets are about more than just providing a safe and pedestrian-friendly setting. Livable streets also provide an urban space/setting that encourages social interaction with the environment in order to promote physical and psychological development. Livable streets elements are as follows:

- A safe space.
- A good community.
- A healthy and livable environment.
- A friendly territory.
- A place for learn and play.
- A green space.
- A unique historic place.

Zhan D. et al. (2018) studied the understanding of residents' satisfaction with urban livability in China. They distributed their designed questionnaires conducted in 2015 in 40 major cities. Surveyed dimensions regarding urban livability were as follows: public facilities, natural environment and the sociocultural environment, urban security, environmental health and transportation. Their results revealed that all six dimensions of urban livability have significant and positive effects on overall user satisfaction, especially concerning the natural environment, transportation and

environmental health are the greatest impacted. Other attributes that have an effect on overall satisfaction with urban livability are location, housing type, education, size of family and age, although their effects are far less than that of the dimensions of urban livability.

Combs S. and Pardo F. (2021) illustrated the significant shift in demand for safe walking, bicycling, and outdoor activities due to the COVID-19 epidemic. Globally, cities enacted a range of laws and initiatives aimed at addressing this shift such as turning out most of the road space for pedestrians, lowering speed restrictions and promoting bike services. Also, the study assessed the future developments of pedestrian and bicycle infrastructure design and implementation, and how transportation professions might evolve in response to lessons learned during and after the pandemic.

In their study, Moreno C. et al. (2021) focused on socioeconomic repercussions on cities during the COVID-19 pandemic leading to total/partial lockdown in most cities worldwide, in order to maintain decent levels of health. Constraints created by the epidemic have necessitated a radical rethink of the city, resulting in the re-emergence of the concept of "15-min City" that was stated before by the author in 2016. The concept complements the existing concepts of smart cities and the rhetoric of creating more humane urban fabrics, as well as creating safer, more resilient, sustainable and inclusive cities. The "15-min City" concept means that basic urban services must be given in close proximity to urban centers, without discriminating people based on their socioeconomic level or age. The study found that Shanghai city (case study) basic utilities are not well distributed along city areas/districts equally and orderly. As poor urban services distribution at peripheries in residential areas necessitated the need for automobiles to access all the available services/facilities, thus making walkability impossible to move around between urban amenities.

Arefi and Nasser (2021) stated that most urban designers realize the necessity of transportation infrastructure in cities, however, sometimes they overlook some of the repercussions. And specifically micro-scale ones: bus stops and sidewalk design impacts on placemaking, pedestrian perceptions of local safety, parking lots width and spacing, and traffic calming devices as viable design solutions. The study addresses a few of these seemingly insignificant, although being really crucial factors of the transportation infrastructure and street network that are sometimes disregarded in urban design practice. Also in their study they examined the relation between urban design, perceived safety, street livability and accessibility in particular.

NABIL T. et al. (2021) discussed the necessity of establishing spaces for social interaction, as well as how to change them into pedestrian-friendly and sustainable, taking into account environmental and social factors. According to their findings, most Iraqi cities lack sidewalks that promote better social interaction and provide individuals with a healthy and safe environment that improves their recreational levels and health. Availability of continual social and recreational activities along the day creates livable and sustainable streets. Also, pedestrian streets express the local identity of the region and could also create an economic investment opportunity for the city, through developing commercial and job opportunities.

Abdulmughni M. et al. (2021) in their study stated that enormous urban expansion had negative effects on the human dimension, as streets became more devoted to transportation rather than to pedestrians. In their research, they studied about two streets in Riyadh that were developed pedestrian-friendly. They investigated in their study the physical aspects of Riyadh streetscapes and defined their influences on the livability and quality of spaces. The study concluded that the length of the street, sort of commercial activity, crossing facilities, the width of the sidewalk and facilities for the disabled are all factors that contribute to the streets' livability. Also, the presence of street greenery, adequate lighting, shadings & canopies, and seating areas/benches all influence streets' livability.

The examined literature, however, assessed the livability of the streetscape and concentrated on a few numbers of physical attributes that affect streets' quality and livability, considering all other factors are the same. Notably, the study exposed that only a few experimental studies tackled the people's perception of certain physical attributes such as affecting the livability of the street. Table 1 indicates a comprehensive review of literature during the last 40 years among the most prominent and referenced urban space architecture researches about streets' physical attributes and the determinants of streets' livability. This research defines 15 physical attributes and makes an attempt to identify which attributes have the greatest impact on street livability.

3 Methodology

Many urban space scholars in the late twentieth century concluded that people's lives are affected by the physical attributes of the built environment. The physical environment may represent people's perceptions, emotions and behaviors that undermine their environmental values (Rapoport, 1982; Sanoff, 1991). The research methodology used in this study is built on Ahmad and Mahmoudi (2015). Similar to the initial study, it examined some physical attributes that contribute to street livability. However, in this research, the methodology was modified to suit the local context. The new research suggests similar trends to those mentioned in the original report and reviewed further literature, and introduces extra features and also additional attributes that were not previously tested as shown in Fig. 1.

Table 1 Livability physical attributes derived from literatures

Photos	References	Specs	Surveyed questions
  **Paving**	– Appleyard (1981) – Rubenstein (1992) – Dumbaugh and Gattis (2005) – Mackett et al. (2008) – Forsyth et al. (2008) – Amr (2015) – Abdelhafeez et al. (2010, 2013) – Mehta (2014) – J Davis (2014) – Helmy (2018) – Yassin (2019) – Ahmad and Mahmoudi (2015) – S. Combs and F. Pardo (2021) – Arefi and Nasser (2021)	– Wideness of pavement (Mackett et al., 2008; Elsawy et al., 2019; Mehta, 2014) – Size and scale of road and pavement (Ahmad & Mahmoudi, 2015) – Pavement quality (Ahmad & Mahmoudi, 2015) – Patterns of pavement especially in the children's area (Nassar, 2015)	– Pavement wideness? (Mackett et al., 2008; Elsawy et al., 2019; Mehta, 2014) – Size and scale of road and pavement? (Ahmad & Mahmoudi, 2015) – Pavement quality? (Ahmad & Mahmoudi, 2015) – Pavement patterns? (Nassar, 2015)
 **Seating**	– Rubenstein (1992) – Mackett et al. (2008) – Abdelhafeez et al. (2010) – Mehta (2014) – J Davis (2014) – Nassar (2015) – M. Abdulmughni et al. (2021)	– Availability of seats (Nassar, 2015; Mehta, 2014) – Sufficient seats (Amr, 2015) – Comfortableness (Amr, 2015) – Seating areas well distributed in order to improve various social activities (Nassar, 2015)	– Are street elements landscapes (street furniture) comfortable? If not please state the reason, are they enough and covering all spaces? If not where are the spaces that are lacking them? (Amr, 2015) – Do you consider the landscape street furniture (benches, seats, lighting fixtures, receptacles…) enough? If not, where? (Amr, 2015; Mehta, 2014)
Shelter & canopy 	– Rubenstein (1992) – Forsyth et al. (2008) – Amr (2015) – Abdelhafeez et al. (2010) – Mehta (2014) – J Davis (2014) – Nassar (2015) – M. Abdulmughni et al. (2021)	– Availability of Shaded areas (Nassar, 2015; Mehta, 2014) – Sufficient/Enough shelters/shadings (Amr, 2015; Nassar, 2013, 2015)	– Do you find sufficient shading on campus? Please state what provides shade (trees, pergolas, concrete shading devices…etc.) (Amr, 2015; Nassar, 2015)

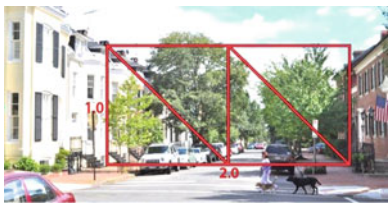
(continued)

Table 1 (continued)

Photos	References	Specs	Surveyed questions
 **Lightening**	– Rubenstein (1992) – Forsyth et al. (2008) – Amr (2015) – Nassar (2015) – J. Davis (2014) – Helmy (2018) – M. Abdulmughni et al. (2021)	– Improve lighting as it increases the safety factor for space users (Nassar, 2015) – Well distribution of lighting items, increases safety level, reflects a clean image and welcoming urban space (Nassar, 2015; Elsawy et al., 2019)	– Sufficient no. of lighting elements? (Nassar, 2015) – Distribution of lighting elements? (Nassar, 2015) – Good lighting (Elsawy et al., 2019)
Signs 	– Rubenstein (1992) – Shalaby (2004) – Dumbaugh and Gattis (2005) – Abdelhafeez et al. (2010, 2013) – J. Davis (2014)	– Are directing signs legible (Amr, 2015) – Signage and landmarks illustrate the public health importance of physical activity (Nassar, 2015)	– Are directing signs legible (easy to read and easy to follow)? (Amr, 2015)
 **Planting**	– Appleyard (1981) – Rubenstein (1992) – Forsyth et al. (2008) – Shalaby (2004) – Amr (2015) – Abdelhafeez et al. (2010, 2013) – Nassar (2015) – Aulia (2016) – Appleyard B (2017) – M. Abdulmughni et al. (2021)	– Toward increasing space exposure and preventing splitting space into isolated dispersed parts, planting elements should be well designed (Nassar, 2015) – To improve space consistency, minimize high-surrounded planting. (Nassar, 2015) – Greenery condition (Nassar, 2015)	– Do you see that the numbers of different landscape elements (trees, plants, paths, plazas, furniture……) are enough? (Please answer for each element) If not where? (Amr, 2015) – E: Are there any sustainable vegetation on your campus? Why are they sustainable? (Amr, 2015) – Greeneries condition? (Nassar, 2015)
  **Sculpture & fountain**	– Rubenstein (1992) – Nassar (2013) – Abdelhafeez et al. (2013) – J. Davis (2014) – Ahmad and Mahmoudi (2015)	– Availability of water features (Abdelhafeez et al., 2013) – It's some kind of work of art and considered as centerpiece for people coming from several parts of the street to take pictures besides the fountain. Also water sound's really relaxing. So, the fountain is found to be of great quality in the street context. (Ahmad & Mahmoudi, 2015) – In most places people feel safe beside the lake (Nassar, 2013)	– Importance of water feature? (Nassar, 2013) – Do water elements improve health? (Ahmad & Mahmoudi, 2015)

(continued)

Table 1 (continued)

Photos	References	Specs	Surveyed questions
 **Proportions of space**	– Lynch (1981) – Forsyth et al. (2008) – Abdelhafeez et al. (2013) – Nassar (2015) – Aulia (2016)	– Human scale (Elsawy et al., 2019)	– Street to building ratio (Elsawy et al., 2019)
 **Harmony of architectural style**	– Lynch (1981) – Rubenstein (1992) – Abdelhafeez et al. (2013) – Ahmad and Mahmoudi (2015) – Elsawy et al. (2019)	– Lack of harmony between various buildings and contrast adversely affect streets' visual integrity (Ahmad & Mahmoudi, 2015) – Harmony of architectural style (Elsawy et al., 2019)	– Harmony of architectural style? (Ahmad & Mahmoudi, 2015; Elsawy et al., 2019)
 **Facilities for disabled people**	– Lynch (1981) – Rubenstein (1992) – Mackett et al. (2008) – Helmy (2018) – Ahmad and Mahmoudi (2015) – M. Abdulmughni et al. (2021)	– Ease of movement (Mackett et al., 2008) – Adequate facilities for the disabled (Ahmad & Mahmoudi, 2015) – Availability of wheelchair facilities (Elsawy et al., 2019)	– Availability and ease of movement of wheelchair? (Elsawy et al., 2019)
 **Parking**	– Appleyard (1981) – Rubenstein (1992) – Shalaby (2004) – Amr (2015) – Tawil et al. (2014) – Aulia (2016) – Arefi and Nasser (2021)	– Availability of parking space (Amr, 2015; Tawil et al. 2014; Ahmad & Mahmoudi, 2015) – Distance of parking from the site (Amr, 2015)	– Do you have a parking problem on campus? If yes, why? (Amr, 2015) – Insufficient parking – Parking charges – Far parking spots – Unsafe parking – Other
 **Accessibility**	– Lynch (1981) – Shalaby (2004) – Mackett et al. (2008) – Amr (2015) – Aulia (2016) – Helmy (2018) – Elsawy et al. (2019) – Yassin (2019) – Zhan D. et al. (2018) Arefi and Nasser (2021)	– Adequate access to public transportation (Ahmad & Mahmoudi, 2015) – Ease access to all facilities (Elsawy et al., 2019)	– Ease of access to public transportation? (Ahmad & Mahmoudi, 2015; Elsawy et al., 2019)

(continued)

Table 1 (continued)

Photos	References	Specs	Surveyed questions
   **Traffic management**	– Appleyard (1981) – Shalaby (2004) – Dumbaugh and Gattis (2005) – Mackett et al. (2008) – Forsyth et al. (2008) – Tawil et al. (2014) – Ahmad & Mahmoudi (2015) – S. Combs and F. Pardo (2021) – Gössling (2020) – Abdel-Aziz et al. (2020) – Arefi and Nasser (2021)	– Quality traffic management (Ahmad & Mahmoudi, 2015)	– Rating quality of traffic management? (Ahmad & Mahmoudi, 2015)
 **Maintenance &cleaning**	– Lynch (1981) – Appleyard (1981) – Rubenstein (1992) – Amr (2015) – J Davis (2014) – Ahmad and Mahmoudi (2015) – Nassar (2015) – Helmy (2018) – Elsawy et al. (2019)	– Quality of maintenance and cleaning of facades and streets (Nassar, 2015; Ahmad & Mahmoudi, 2015; Elsawy et al., 2019)	– Rate quality of maintenance and cleaning of the surveyed street? (Ahmad & Mahmoudi, 2015; Elsawy et al., 2019)
Street Clutter 	– Dumbaugh and Gattis (2005) – Amr (2015) – J Davis (2014)	– Irregular distribution of signs (Ahmad & Mahmoudi, 2015)	– Distribution of street furniture? (Ahmad & Mahmoudi, 2015)

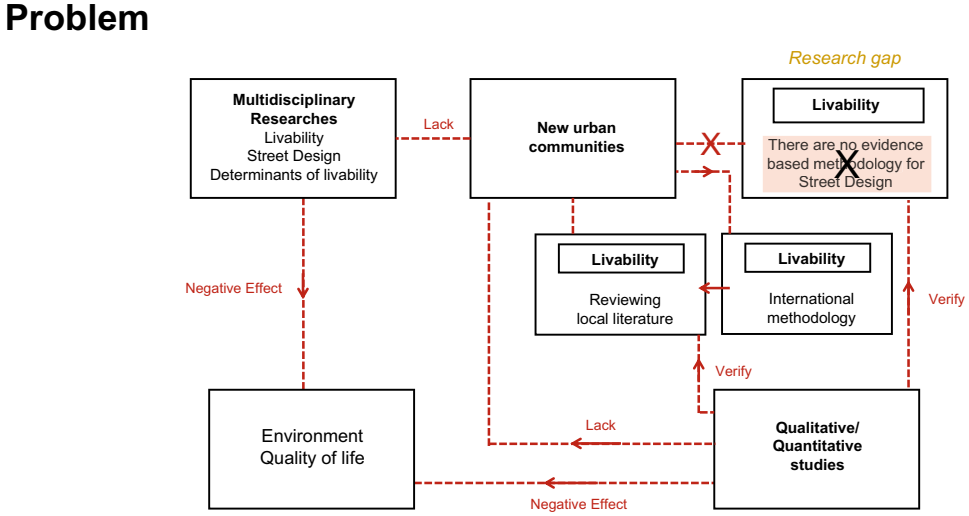


Fig. 1 Diagram showing the broken cycle between livability research and streets' planning in Egypt. *Source* Author

This study is based on reviewed literature from 1980 to 2020, providing a framework for studying physical attributes that has the greatest impact on streets' livability. Among the most well-known and referenced urban space architecture researches about streets' physical attributes and the determinants of streets' livability, there is a group of attributes consistently found to be investigated throughout the literature such as seating, traffic management and shelter. On the other hand, fewer studies reviewed attributes like the orientation of the street or street skyline. To provide this context, these attributes have been chosen among several frequently referred ones defined by various sources as the most frequently cited physical attributes.

An international case study for vibrant livable streets would be studied carefully, assessed and evaluated, and to find out which physical attributes determine their livability. Then, the concluded physical attributes from these case studies would be filtered. Finding out which physical attributes are missed in the Egyptian new urban cities context, not only this but also the ones that could be adapted and implemented. On the other hand, two local streets are chosen to be studied, analyzed and evaluated from new urban cities streets' in Egypt. The chosen streets to perform the study are allocated in El Sheikh Zayed city (one of the most well-known Egyptian new urban cities). These two streets are widely known for their high accessibility, vitality and vibrancy and are also economically and socially important for city life.

First, El Bostan street is one of the most trafficked streets in the city. The importance of this route/street is that it works as a central route serving numerous destinations that are parallel to the main axis of the Mehwar road and binds it to the city of El Sheik Zayed. It includes a high intensity of different activities from educational centers (e.g., Cairo University), commercial centers (Americana plaza, Arkan plaza, Capital business park, Tivoli dome, etc.), office areas (Arkan plaza, Capital business park, Juhayna headquarter, Edita headquarter, etc.) residential dwellings/compounds to different domestic uses. El Bostan street has four main intersections: Al Nozha street, Dorra Circle, El Safa street and El Amal street. It is noted that El Bostan street is one of the main anchors for local use; it is also highly attractive and accessible by passing vehicles that connect various neighborhoods/districts. El Bostan street is made of four sides; each direction consists of two: main and service roads. The main road consists of three lanes and service one consists of two lanes. It offers multiple uses for the local community; recreational, working places, shopping etc. The street offers multiple uses/services such as restaurants, bars, malls and other attractions that provide for the daily needs of the street inhabitants as well as those who visit the route.

Secondly, El Mostakbal street is one of the most notable streets in the city. The importance of this route/street is that it works as a central route serving numerous destinations. It includes a high intensity of different activities such as educational centers (schools, nurseries, etc.), commercial centers, residential dwellings/compounds and also religious ones. El Mostakbal street has four main intersections: Atef Sedky street, El Hekma street, El Safa street and El Amal street. Not only this but also El Mostakbal street is one of the main anchors for local use as it serves as a highly attractive and accessible by passing vehicles that connect various neighborhoods/districts. El Mostakbal street is a two-way street with four lanes on each way. It provides multiple uses for the surrounding community: recreational, working places, shopping etc. The street offers multiple uses/services such as restaurants, cafes, supermarkets and other attractions that provide for the daily needs of the street inhabitants as well as those who visit or even just walk the route. Throughout this context, to reduce the various deficits that occur along the street, it should be able to develop. Also, the pedestrian requirements should be given more attention. In order to attract users, some elements need to be developed.

The methods of data collection used in this study are intended to cover all facets of the thesis while considering the different viewpoints of associated parties. Both qualitative and quantitative data will be used in this study as shown in Fig. 2. Qualitative data will be collected by literature review, questionnaire and site systematic analysis (structured observation), while quantitative data will be retained as measurements and values that can help to explore the ones that promote street livability. Structured observations and questionnaires will be used to gather data on street users' preconception of the streets' physical attributes that encourage the livability of streets. Both selected multifunctional streets are located in El Sheikh Zayed city. Streets were selected based on the fact that future developments in Egyptian countries focus on developing new cities. These streets are highly accessible, crucial, economic and socially important streets in the selected city (El Sheikh Zayed city). To generalize the findings of the research according to (Yin, 2003), the need for findings to be repeated so that at least two (case studies/examples) to be tested. And secondly, the limitations of this study, which are time and budget are constraints for conducting this research.

Questionnaires discover the viewpoint of participants on the efficiency and livability of areas studied, and the impact of findings on street livability and define the most prominent ones that are determinants of street livability. At the analysis stage, observation outcomes would be utilized to interpret the outcome of the questionnaire/survey. A questionnaire will be designed to define livability determinants in streets; in order to assess the point of view of the users, a pilot study will also be performed. A developed questionnaire using physical attributes concluded from reviewed literature would be circulated over 15 days among 110 users from passersby

Methodology

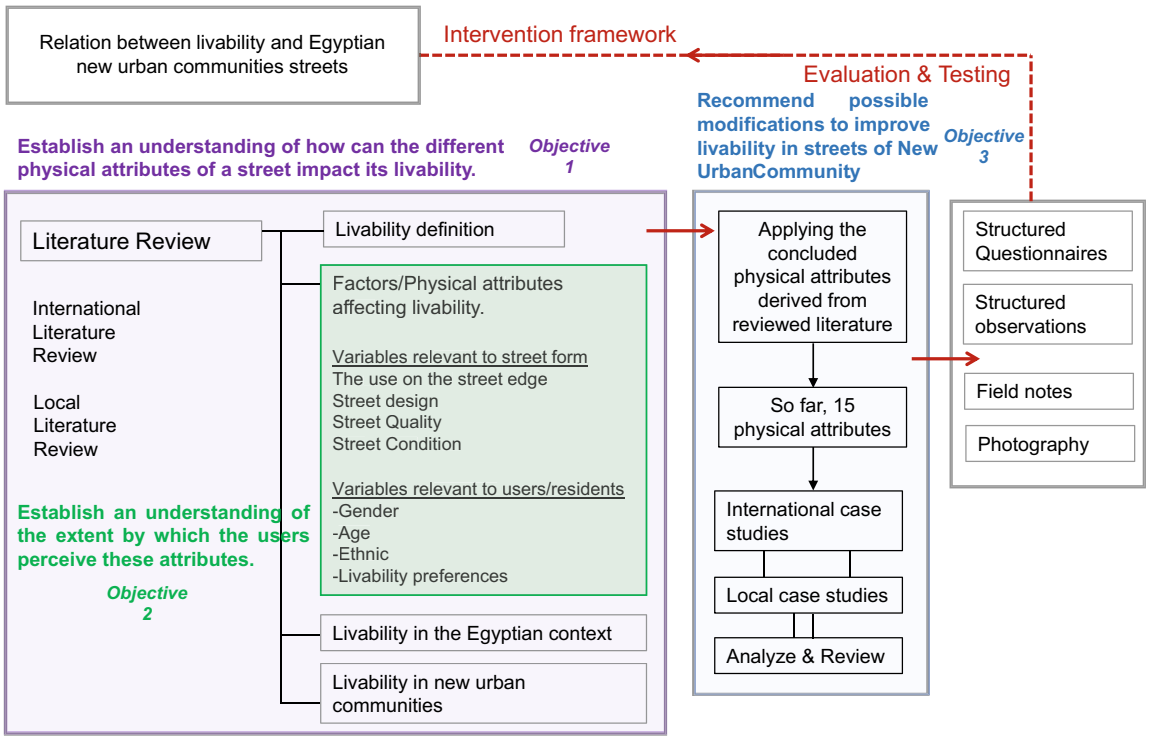


Fig. 2 Research framework illustrating the structure of study flow. *Source* Author

of studied areas who recognize those streets very well. Also, the physical attributes listed will be included in the questionnaire and questioned to participants if they affect the area's livability or not. And other attributes that might be confusing to participants, such as buildings' heights, street skyline and streets' orientation will be neglected. So, 15 physical attributes were listed as major contributing factors to the livability of streets, which are identified as pavement, seating, shelter (shading) and canopy, illumination/lighting, signage, planting, sculpture and fountain, space proportions, harmony between the various buildings' architectural style, handicapped facilities, parking, accessibility, traffic management, maintenance and cleaning, and street cluttering.

This research focuses on identifying the streets' main physical attributes that lead to livable streets in Egypt via providing empirical evidences. Also aiming to answer the following research questions:

- What are the physical attributes of streets that are acknowledged in literature to impact streets livability?
- To what extent are these attributes implemented in the streets of new urban communities?
- To what extent do the street users perceive the presence/absence of these attributes?
- To what extent are these attributes impacting livability in new urban communities?

Also, this research aims to:

- Establish an understanding of how can the different physical attributes of a street impact its livability.
- Establish an understanding of the extent to which the users perceive these attributes.
- Recommend possible modifications to improve livability in the streets of the New Urban Community.

Observations are among the most widely used post-occupancy analysis techniques used in many urban space researches (FRANCIS, 2003). The qualitative analysis involved quality, harmony and adequacy. Direct observation and an objective examination of the physical attributes of surveyed streets were pursued for visual evaluation by taking field notes and photos. To ensure liability of concluded attributes, areas chosen will be observed frequently at different times of the day all over the week and also at peak hours over three months. Data collection either by observation, field notes or photography for each of the attributes examined is registered and tabulated together and given a

database for each attribute to be tested. Therefore quality, adequacy and harmony of each attribute were explained by analyzing these details, and findings from this part will be used later on to replicate the results of the questionnaire.

A survey would be designed and distributed, targeting to explore the perspective of users on found physical attributes and their impact on street livability. As discovered by several researches, streets' livability and efficiency cannot be determined without taking into consideration the understanding of people who typically inhabit the space (Nasar 1988). And to achieve this, a brief/simple definition of livability and livable streets to ensure that all participants understand well the meaning of these expressions will be added as an introduction to the survey. Then, users' attitude toward the listed subjects would be measured through the Likert scale. Five alternatives from "very poor to very good" with users' points of view will be included in the model and people who have no idea labeled "average". Bardo et al. (1982) recognized that the reliability of the scale decreased as the number of answer points surpassed two. Also, this was reinforced by the fact that the reliability of the Likert scale increased from 2 to 5 (Lissits & Green, 1975). Not only this but also a pilot study will be conducted to evaluate the questionnaire's validity for uncertainty and ease of comprehension. Once feedbacks are obtained and their recommendations were incorporated, the questionnaire will be completed and prepared for delivery.

Users of the two multifunctional surveyed streets, Al Mostakbal and Al Bostan streets, who are residents, workers or passers-by and know the area very well, are the targeted ones. A survey sample consists of 100 participants and this is the least amount for data analysis (Dooley, 2001). Residents, workers and passers-by of such multifunctional streets are usually too large and their sociodemographic characteristics are diverse. Furthermore, the population size is unknown as there is no knowledge about the average daily number of pedestrians on these streets. In this study, the questionnaire design was derived from questionnaires/surveys included in the reviewed literature. Participants will be chosen 18 years of age or above from both genders. A total of 110 participants will therefore be selected to make the study feasible and to fulfill this requirement. Participants will be randomly picked. Distributed questionnaires will be circulated throughout the day (working days and weekends) with an average of 10 min each.

4 Quantitative Review

From the 110 questionnaires provided, 86 (78.2%) questionnaires were completed and empirically verified. However, 12 (nearly 11%) questionnaires obtained were incorrectly completed and thus excluded. Figures 3, 4, 5 and 6 demonstrate the type of users, people's level of familiarity with selected streets, also how often do they visit them and the type of activities they perform in their leisure time. Table 2 demonstrates people's recommendations/answers to surveyed streets. The outcome of this survey reveals how the design, quality and condition of surveyed spaces affect the livability of them. About 68% of Al Bostan's participants agreed that the street is livable; on the other hand, 24% objected livability of the street. Almost 72% of the participants in Al Mostakbal agreed with the area's quality and livability, and only 18% of the participants disapproved to consider the space livable. Furthermore, 8 and 10% of participants were neutral and had no clear information about Al Bostan street and Al Mostakbal street quality and livability, respectively.

5 Review of Data

After evaluating the results, this research aims to explore the level of acceptance of users on found physical attributes that determines streets' livability and their impact on street livability. As noted before, this questionnaire will be introduced to five categories of users' responses as "very poor, poor, average, good and very good". So participants' behavior will be defined according to these categories in order to improve their understanding of responses. Moreover, the answers of participants who are ignorant of the livability of surveyed areas and the consistency of defined attributes were excluded. The quantitative data analyses are then used to measure the overall outcome and expose the effect of physical streets' characteristics on the promotion of the area's efficiency and livability. Quantitative analysis will be used for evaluating the results from questionnaires after sorting the categories. To examine the validity of the research, a reliability check is also carried out to test the reliability of variables, which will be measured using SPSS analysis as shown in Tables 3, 4 and 5.

6 Findings, Discussions and Visual Evaluation

Throughout the last 9 months, from December 2019 to August 2020, observational and questionnaire surveys were performed to provide a database for assessment of the area's livability as well as prominent physical attributes leading to livable/vital streets. First, there will be a quick illustration of an international case study. Then, an illustration of two surveyed streets in El Sheikh Zayed city is shown in Figs. 7, 8, 9, 10 and 11. Not only this but also some field notes accompanying the pictures were written throughout the assessment of the areas discussed below. The characteristics

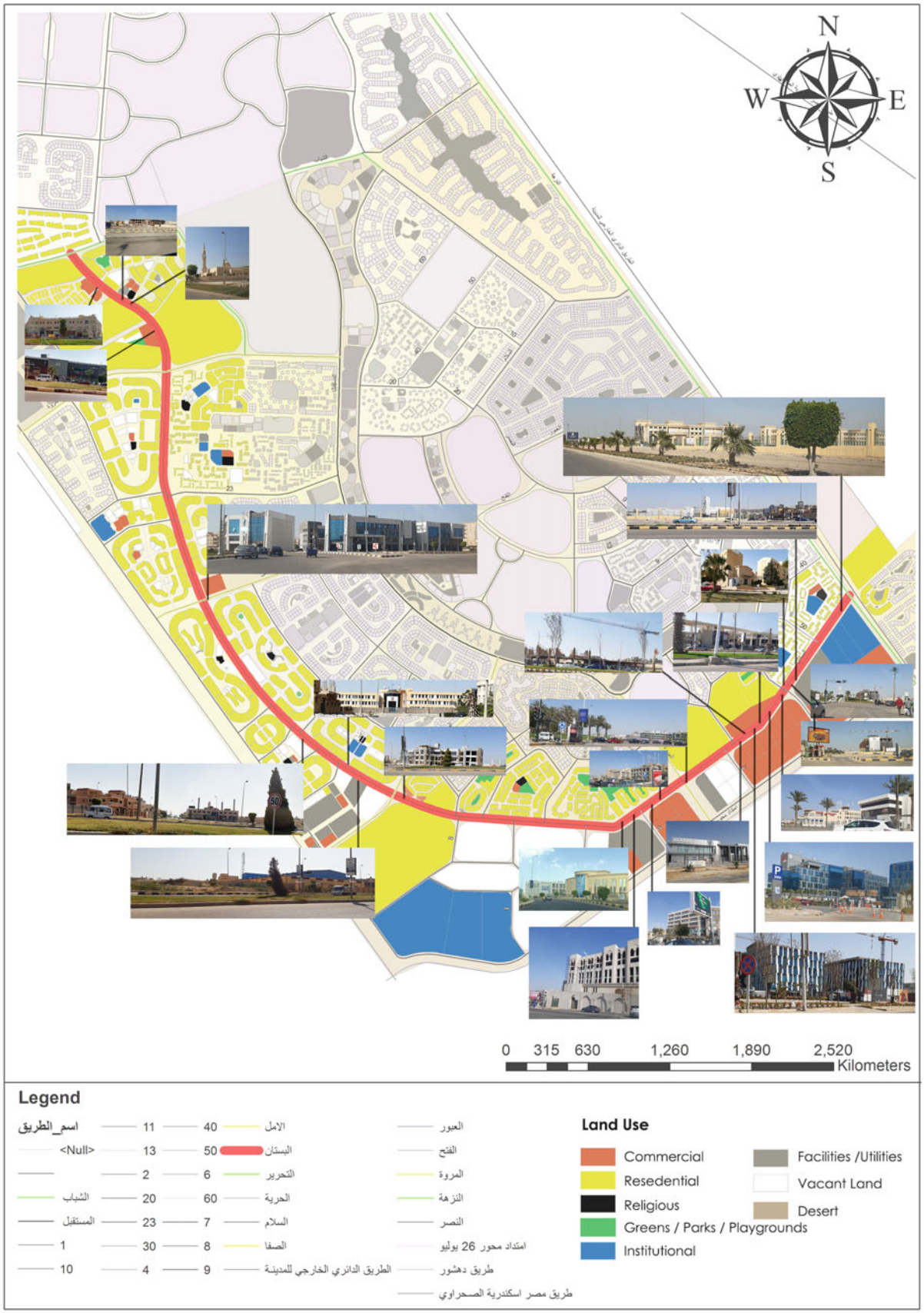


Fig. 3 Familiarity to the space

Fig. 4 The number of times for visiting the space

Fig. 5 Type of users using the space

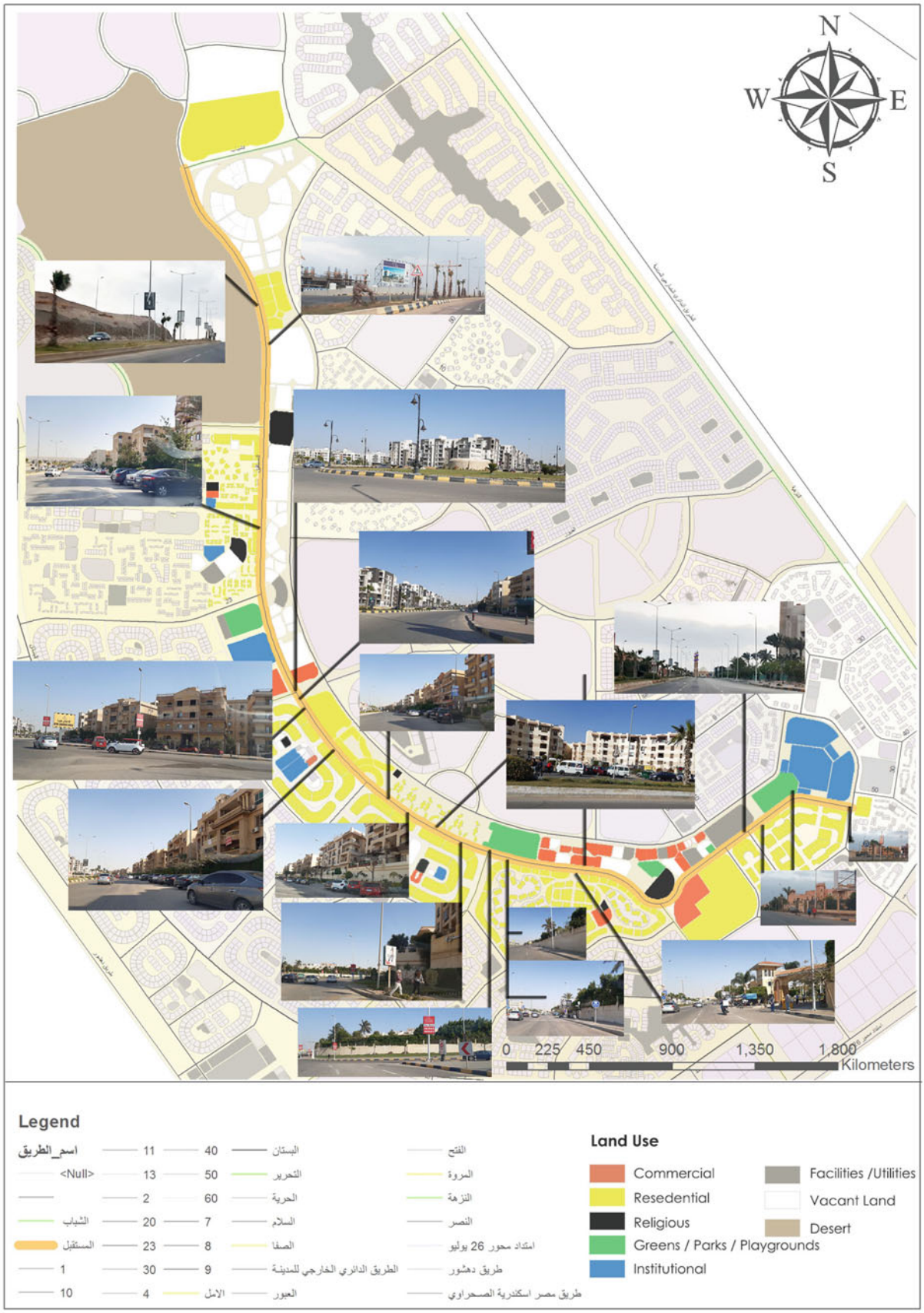


Fig. 6 Activities/hobbies that may take place in the space

Table 2 Participants most repeated answers/recommendations to survey questions

Question	Participant's answers/recommendations
Leisure activity suggested to be added to the space	– More wide pavements – Increase seats for social interaction – Provide more shaded areas – Improve night lighting – Improve greeneries/planting maintenance condition – Adding a water feature to the space – Traffic management between pedestrians and vehicles – Improves maintenance and cleaning of the space – Reduce/remove unnecessary furniture, signs, etc.
Suggested activities to be added to the space	– Walking/running track – Playing area for children – Outdoor space for physical exercise/activity
Users recommendations	– Enhancing the space exposure and preventing dividing it into isolated fragmented sections by redesigning planting elements – Improve lighting increases the safety factor for users of the space – Pedestrian paths surrounding the space should be redesigned to abide them from being used as car parking areas – Increase parking lots

Source Author

Table 3 Users' gender percentage of surveyed streets

Gender		El Mostakbal	El Bostan
Valid	Male	68.8	58.3
	Female	31.2	41.7
	Total	100.0	100.0

Source Author

Table 4 Average age of users of surveyed streets

Age	El Mostakbal	El Bostan
Mean	29.92	29.92
Median	28.50	28.50
Std. deviation	10.068	10.068
Range	30	30
Minimum	18	18
Maximum	48	48

Source Author

of physical attributes of the areas examined are exposed through photos and notes.

7 Quantitative Examination

Survey results reveal how these spaces are perceived as livable and quality ones by people. Almost 72% of El Mostakbal street respondents confirm the streets' livability, and 18% disagree. While in El Bostan street, 24% of respondents disagree, and 68% confirm the livability of the street. Yet, 10 and 8% of respondents were neutral, respectively, and their answers' revealed the unawareness of surveyed spaces. Research findings show that majority are not satisfied with surveyed streets as livable and quality ones, although El Mostakbal street is higher in quality.

8 Analysis Results

From observation and questionnaire results, many disabled facilities are applied and implemented on both surveyed streets, although most of them are not implemented/maintained correctly (e.g., implementation of small pillars in the middle of crossings on the middle island on both edges to prevent cars from using it as illegal U-turn). So, these pillars are considered an obstacle in front of wheel chairs' movement. Also, pedestrian ramps should be distributed along the pavement orderly (every 200 m). User-friendly pavement types are recommended to be used instead of the one implemented, to provide friendlier and more comfortable facilities to disabled users. All of these reinforce the findings of (Mackett et al., 2008) concerning

Table 5 Descriptive statistics for participants most repeated answers/recommendations to survey questions

Physical attributes	El Mostakbal Street				El Bostan Street			
	Min.	Max.	Mean	Std. deviation	Min.	Max.	Mean	Std. deviation
Pavement	−2.00	2.00	0.2500	1.13818	−2.00	1.00	−0.2500	1.13818
Seating areas	−1.00	1.00	−0.0833	0.79296	−1.00	1.00	−0.4167	0.66856
Shading and canopy	−1.00	2.00	0.4167	0.90034	−2.00	1.00	0.5000	0.79772
Lightening	−1.00	2.00	0.5833	0.79296	−1.00	1.00	0.0833	0.79296
Signs	−2.00	2.00	0.0833	1.16450	−2.00	2.00	0.4167	1.08362
Planting	0	2.00	1.0000	0.85280	0	2.00	1.0833	0.79296
Sculpture & fountain	−2.00	2.00	0.1667	1.19342	−2.00	2.00	0	1.20605
Harmony between architectural style of different buildings	−2.00	2.00	−0.1667	1.40346	−2.00	2.00	0.5000	1.16775
Proportions of space	−2.00	2.00	0.0833	1.50504	−2.00	2.00	0.2500	1.28806
Facilities for disabled people	−2.00	1.00	0.0000	0.95346	−2.00	1.00	−0.5000	0.90453
Parking space	−1.00	1.00	0.2500	0.75378	−1.00	1.00	−0.0833	0.79296
Traffic management	−1.00	1.00	0.0000	0.85280	−1.00	1.00	0.3333	0.77850
Accessibility	−1.00	2.00	0.6667	0.98473	−1.00	2.00	0.8333	0.83485
Maintenance & cleaning	−1.00	2.00	0.3333	0.98473	−2.00	1.00	−0.2500	0.96531
Street clutter	−2.00	1.00	−0.3333	0.98473	−2.00	1.00	−0.5833	0.99620

Source Author

the importance of basic street facilities for disabled people for ease of access and other needed services. Proper paving, planting, maintenance, cleaning, traffic management, adequate parking spaces and street clutter in respondents' point of view are the main attributes that improve the livability of surveyed streets. Also traffic calming effects have a significant effect on streets' livability, and this reinforces the findings of (Appleyard & Lintell, 1972) and (Appleyard, 1981) that defined traffic impacts on streets' livability. Most results are common in studied streets, revealing that proper paving, planting, maintenance, cleaning, traffic management, adequate parking spaces and street clutter are the main physical attributes of El Sheikh Zayed City to have quality and livable streets. These street improvements will encourage users to walk, reinforcing the findings of Forsyth et al. (2008), Sauter and Huettenmoser (2008) and Park (2008) that had a significant impact on encouraging walkability through traffic management. Also, studies provide the same results when examining physical attributes in different urban settings, as testing the relation between planting and livability of streets that reinforces the results of (Layne, 2009) and (Bosselmann et al., 1999) emphasizes landscape significance in urban settings. To sum up, most research results confirm the previously reviewed literature with few exemptions. Lack of design, for signage distribution, has a minimal impact on the quality and livability of streets. This might be a result of users' ignorance about the negative effects of this problem. A livable concept, in general, and livable streets especially and the significance of the physical environment were identified 40 years ago. Despite the fact that most of our streets are still not livable and miss basic physical attributes (e.g., adequate/good/proper planting) that improves and beautifies space quality and promotes street livability.

9 Conclusion

This study examines how people understand streets' physical attributes effect on Egypt's streetscapes. Accordingly, this study explores the provision of basic facilities such as proportions of space, maintenance, cleaning, parking and traffic management that will affect street livability in new urban communities. The research aims to define determinants of streets' livability in Egypt by analyzing streetscapes' physical attributes in two multifunctional streets in new urban communities. Research results revealed that streets' physical attributes promote livability and quality of city streets. Furthermore, some suggestions are proposed for improving the quality and livability in areas examined and also improving the efficiency of determinants for streets' livability. So, 15 physical attributes were concluded that determine streets' livability: paving, seating, shelter and canopy, good lighting, legibility of signs, planting (good greeneries condition), availability of water features, the proportion of spaces, harmony of architectural style between buildings, handicapped

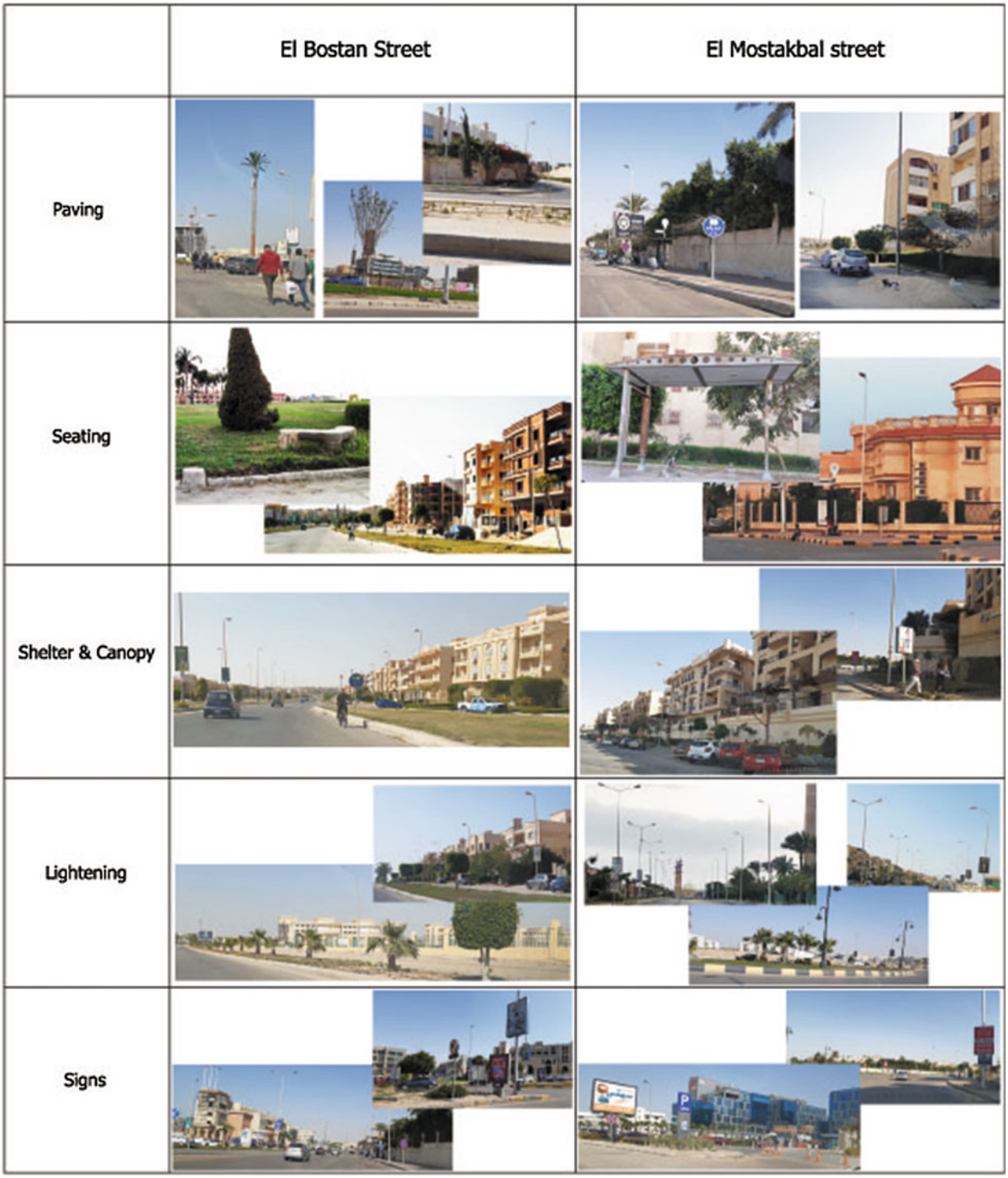


Fig. 7 A comparison between the 15 physical attributes that determines streets' livability between the two surveyed streets (*Source* Author)

facilities, parking, ease of accessibility, traffic management, good maintenance, cleaning and street clutter. Hence, most of these attributes already existed, so problems found by structured observations and questionnaires are related to a lack of proper management of streets' and enhancing attributes quality. It is recommended to increase the pavement's width, repair/renovate deteriorated paving, and maintain and clean the surveyed areas. Moreover, it is highly recommended to collect/remove rubbish more frequently at different times of the day. Also providing the surveyed spaces

Fig. 7 (continued)

Fig. 7 (continued)

with shading devices (e.g., plants that provide shade) and seating areas is a must; removing unnecessary signs, advertisements and street furniture to eliminate/reduce street clutter is highly recommended; allocating water features for the site if possible would increase streets' livability and quality; and lowering the speed of cars, especially in most crowded zones of streets (e.g., by using Woonerf, street bumps, road markings and signs). Also, redesigning, repairing and renovating the affected parts/zones will improve the quality of the physical environment. Moreover, providing more parking spaces and separating pedestrians' paths from cars movement needs improvement. Furthermore, pedestrian crossings need to be improved to be safer for users (e.g., the use of crossing buttons/devices). In addition, the location of surveyed streets' from a new monorail that is now under construction will ease the accessibility to public transportation in the future and will encourage walkability in El Sheikh Zayed streets. This will probably raise sufficiency, quality and reliability of public transport and also would reduce streets' congestions significantly because of lowering in use of private cars. Besides, providing cheap/free parking is highly recommended, that will avoid the issue of double parking and parking of cars on both sides of streets, causing streets' congestions and leading to less safe streets. There are some unused/neglected parts in studied streets that are recommended to be used as parking spaces.

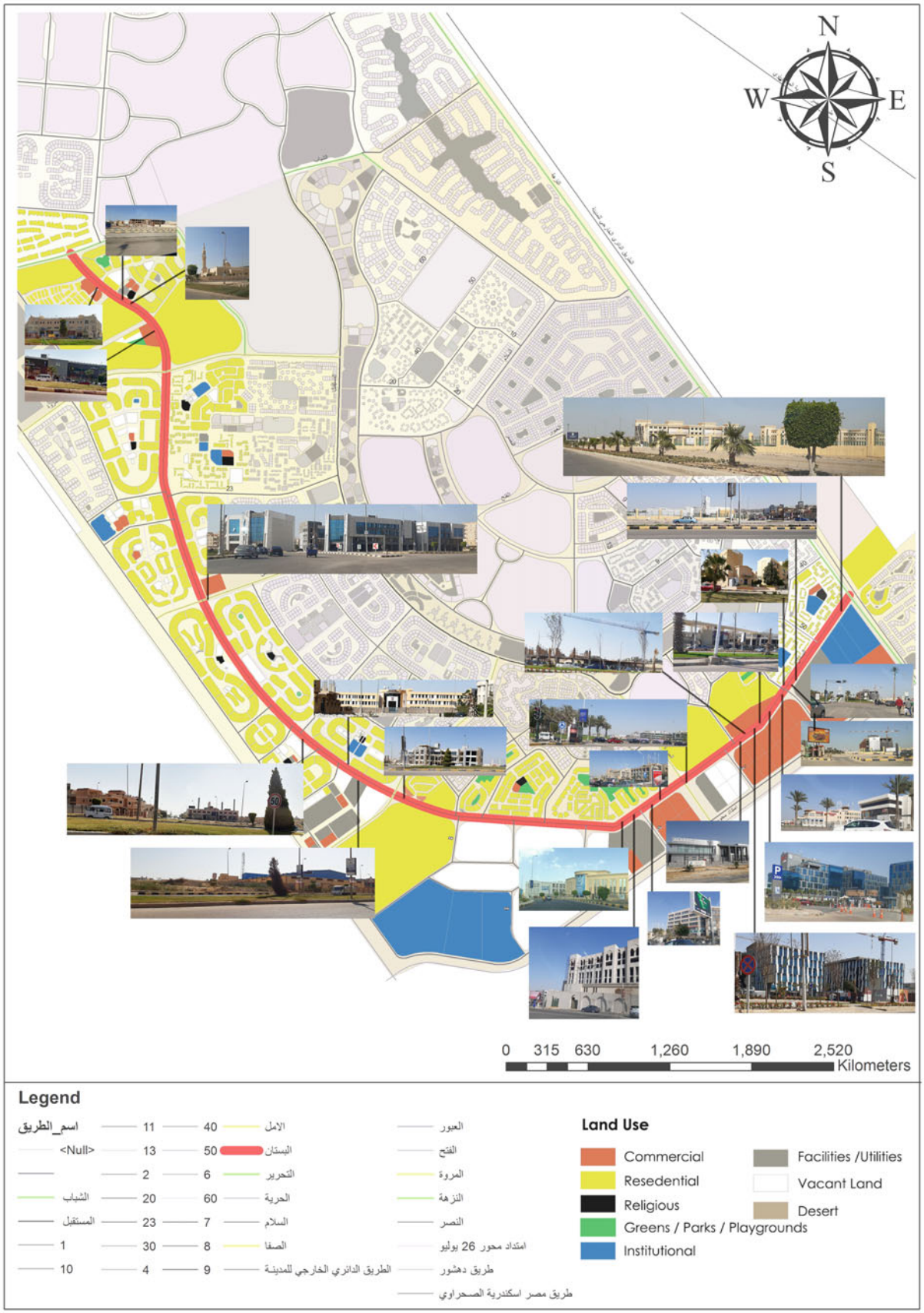


Fig. 8 Map showing commercial and services areas/zones/units located on both sides of studied street/area (El Bostan street) *Source* Author

Fig. 9 Map showing residential areas/zones/units located on both sides of studied street/area (El Bostan street). *Source* Author

Fig. 10 Map showing commercial and services areas/zones/units located on both sides of studied street/area (El Mostakbal street). *Source* Author

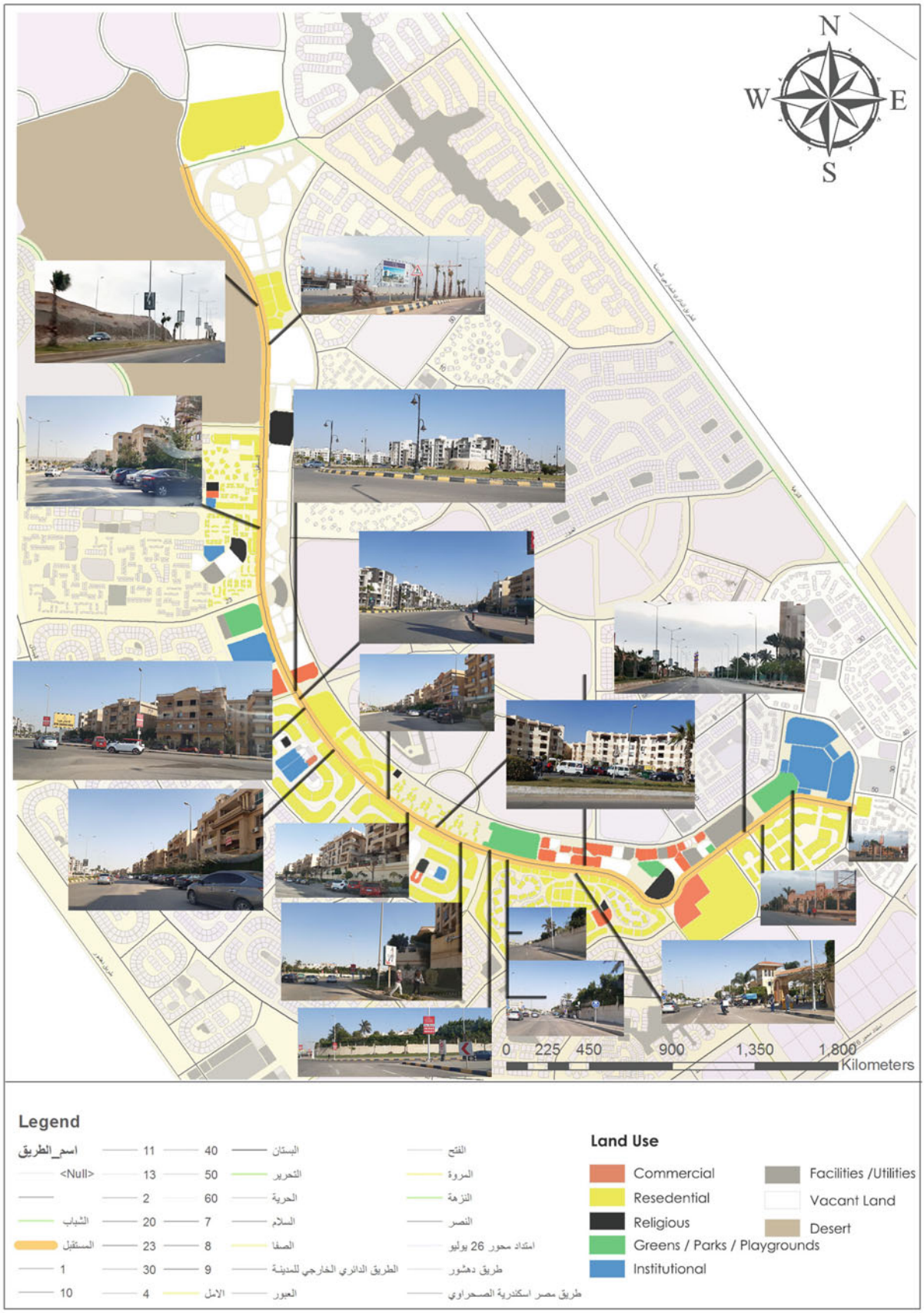


Fig. 11 Map showing residential areas/zones/units located on both sides of studied street/area (El Mostakbal street). *Source* Author

References

Abdel-Aziz A., Abdel-Salam H., El-Sayad Z. (2020). Reshaping the urban experience: Prospects for digital streetscape towards better livability in public spaces.

AbdelHafeez, M., Badran, E., & Nassar, U. (2010). *Principles to evaluate historic designed landscape of urban parks, case study of Al-Azhar Park*.

AbdelHafeez, M., Badran, E., & Nassar, U. (2013). *Experiential landscape as a tool to enhance behavioral response of users in urban parks, case study of Al-Azhar Park*.

Abdulmughni, M., Alzamil, S., & Alabed, M. (2021). The characteristics of livable streets: A study of physical aspects of two streets in Riyadh. *Journal of Urban Research, 39*(1), 43–58.

Ahmad, & Mahmoudi. (2015). *Determinants of livable streets in Malaysia: A study of physical attributes of two streets in Kuala Lumpur, Malaysia*.

Amr. (2015). *Sustainable landscape in university campus urban design*.

Appleyard, D. (1981). *Livable streets*. University of California Press.

Appleyard, B. (2017). The meaning of livable streets to schoolchildren: An image mapping study of the effects of traffic on children's cognitive development of spatial knowledge. *Journal of Transport & Health.*

Appleyard, D., & Lintell, M. (1972). The environmental quality of city streets: The residents' viewpoint. *Journal of the American Institute of Planners, 38*(2), 84–101. https://doi.org/10.1080/01944367208977410

Arefi, M., & Noha, N. (2021). Urban design. *Safety, Livability, & Accessibility*. https://doi.org/10.1057/s41289-021-00155-9

Aulia. (2016). *A framework for exploring livable community in residential environment. Case study*. Public Housing in Medan, Indonesia. www.sciencedirect.com

Bardo, J. W., Yeager, S. J., & Klingsporn, M. J. (1982). Preliminary assessment of format-specific central tendency and leniency error in summated rating scales. *Perceptual and Motor Skills, 54*(1), 227–234.

Bohl, C. C. (2002). *Place making: Developing town centers, main streets, and urban villages*. Urban Land Institute.

Bosselmann, P., Macdonald, E., & Kronemeyer, T. (1999). Livable streets revisited. *Journal of the American Planning Association, 65*(2), 168–180.

Carr, S., Francis, M., Rivlin, L., & Stone, A. (1992). *Public space*. Cambridge University Press.

Combs, T. S., & Pardo, C. F. (2021). Shifting streets COVID-19 mobility data: Findings from a global dataset and a research agenda for transport planning and policy. *Transportation Research Interdisciplinary Perspectives*. https://doi.org/10.1016/j.trip.2021.100322

Dooley, D. (2001). *Social research methods* (4th ed.). Prentice Hall.

Dumbaugh, E., & Gattis, J. (2005). Safe streets, livable streets. *Journal of the American Planning Association, 71*(3), 283–300.

Elsawy, A. A., Hany, M. A., & Saadallah, D. (2019). Assessing livability of residential streets—Case study: El-Attarin, Alexandria, Egypt. www.elsevier.com/locate/aej, www.sciencedirect.com

Forsyth, A., Hearst, M., Oakes, J. M., & Schmitz, K. H. (2008). Design and destinations: Factors influencing walking and total physical activity. *Urban Studies, 45*(9), 1973–1996.

Francis, M. (2003). Urban open space.

Francis, M. (1991). The making of democratic streets. In A. V. Moudon (Ed.) *Public streets for public use*. Columbia University Press.

Gehl, J. (2001). *Life between buildings: Using public space*. Danish Architectural Press.

Gössling, S. (2020). Why cities need to take road space from cars—And how this could be done. *Journal of Urban Design, 25*, 443–448.

Hartanti, N. B. (2012). Street as livable space in the urban settlement (p. 9). Trisakti University.

Hartig, T. A., Korpela, K., Evans, G. W., & Garling, T. (1997). A measure of restorative quality in environments. *Scandinavian Housing & Planning Research, 14*, 175–194.

Helmy. (2018). *Rethinking public space: Livability as a strategy for safe places*.

Jackson, J. B. (1985) Vernacular space. *Texas Architect, 35*(2).

Jacobs, J. (1961). *The death and life of great American Cities*. Random House Digital, Inc.

Jacobs, A. B. (1993). *Great streets*. MIT Press.

Jacobs, J. (1995). Uncanny Australia. *Ecumene, 2*(2), 171–183.

Jacobs, A., & Appleyard, D. (1987). Toward an urban design manifesto. *Journal of the American Planning Association, 53*(1), 112–120.

J Davis, C. (2002). *Proceedings of the Institution of Civil Engineers—Municipal Engineer* (Vol. Volume 151 Issue 3). https://doi.org/10.1680/muen.2002.151.3.231

J Davis, C. (2014). *Street design for all*. Public Realm Information and Advice Network (PRIAN). www.PublicRealm.info

Kaplan, R. M., & Bush, J. W. (1982). Health-related quality of life measurement for evaluation research and policy analysis. *Health Psychology, 1*(1), 61.

Layne, M. R. (2009). *Supporting intergenerational interaction: Affordance of urban public space*. Ph.D. Thesis, Graduate Faculty of North Carolina State University.

Leinberger, C. B. (2008). *The option of urbanism: Investing in a new American dream*. Island Press.

Lissitz, R. W., & Green, S. B. (1975). Effect of the number of scale points on reliability: A Monte Carlo approach. *Journal of Applied Psychology, 60*(1), 10.

Lynch, K. (1981). A theory of good city form. In *Chapter Two—Mapping method: Physical & spatial characteristic of environment*. MIT Press.

Mackett, R. L., Achuthan, K., & Titheridge, H. (2008). AMELIA: Making streets more accessible for people with mobility difficulties. *Urban Design International, 13*(2), 80–89.

Marcus, C. C., & Francis, C. (Eds.). (1998). *People places: Design guideline for urban open spaces*. John Wiley & Sons.

Mehta, V. (2014). Evaluating public space. *Journal of Urban Design, 19*(1), 53–88.

Moreno, C., Zaheer, A., Didier, C., Catherine, G., & Pratlong, F. (2021). Introducing the "15-Minute City": Sustainability, resilience and place identity in future post-pandemic cities. *Smart Cities.* https://www.mdpi.com/journal/smartcities.

Nabil, T., Samaan, M., & Nabil, M. (2021). Role of pedestrian streets in improving urban environment and livability in the city: Al-Tabou street – Baqubah city -Diyala- Iraq.

Nasar, J. L. (1988). *Environmental aesthetics: Theory, research and applications*. University Press.

Nassar, U. A. (2015). *Urban space design to enhance physical activities and motivate healthy social behavior in Cairo, Egypt* (p. 11). Istanbul, Turkey.

Park, S. (2008). Defining, measuring, and evaluating path walkability, and testing its impacts on transit users' mode choice and walking distance to the station. Ph.D. Thesis, University of California.

Places in the Making: MIT Report Highlights the "Virtuous Cycle of Place making." Retrieved May 16, 2017, from https://dusp.mit.edu/sites/dusp.mit.edu/files/attachments/project/mitdusp-places-in-the-making.pdf

Portella, A. A. (2007). Evaluating commercial signs in historic streetscapes: The effects of the control of advertising and signage on user's sense of environmental quality. PhD Thesis, Oxford Brookes University.

Rapoport, A. (1982). *The meaning of the built environment: A nonverbal communication approach*. Sage Publications.

Rehan, R. M. (2013). Sustainable streetscape as an effective tool in sustainable urban design. *Housing and Building National Research Center Journal, 9*(2), 173–186.

Rubenstein, H. M. (1992). *Pedestrian malls, streetscapes, and urban spaces*. John Wiley & Sons, Inc.

Sauter, D., & Huettenmoser, M. (2008). Liveable streets and social inclusion. *Urban Design International, 13*(2), 67–79.

Shalaby. (2004). *Sustainable urban landscapes in neighbourhoods*.

Shantz, A., & Latham, G. P. (2009). An exploratory field experiment of the effect of subconscious and conscious goals on employee performance. *Organizational Behavior and Human Decision Processes, 109*(1), 9–17.

Tawil, M., Reicher, C., Ramadan, K., & Aljafari, M. (2014). Towards more pedestrian friendly streets in Jordan: The case of Al Medina Street in Amman. *Canadian Center of Science and Education, 7* (1913–9071), 16. https://doi.org/10.5539/jsd.v7n2p144

Yassin. (2019). *Livable city: An approach to pedestrianization through tactical urbanism*. www.elsevier.com/locate/aej, www.sciencedirect.com

Yin, R. K. (2003). *Case study research design and methods* (3rd ed.). Sage publication.

Zalloom, B. (2017). Creating livable public spaces. In *The European Conference on Sustainability, Energy & the Environment 2017 Official Conference Proceedings,* Zarqa University, Jordan.

Zhan, D., Kwan, M. P., Zhang, W., Fan, J., Yu, J., & Dang, Y. (2018). Assessment and determinants of satisfaction with urban livability in China. *Cities, 79*, 92–101.