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The Characteristics of Livable Streets: A Study of Physical Aspects of two Streets in Riyadh

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ABSTRACT

Riyadh is one of the major capital cities of the world, its urban fabric has been affected by rapid urbanization and population growth. Enormous urban expansion has had negative effects on the human dimension, as the streets became more devoted to transportation rather than an integrated urban space. The local municipalities in Riyadh have exerted efforts to restore the human dimension to streets by developing urban spaces and built environments. However, these efforts did not provide a strategy for creating livable streets, because they were built based on individual initiatives. This work aims to investigate the physical aspects of Riyadh streetscapes and define their influences on the livability and quality of spaces. This paper provides a descriptive analysis of two streets in Riyadh, Tahlia Street and Tabuk Street, which have been developed to make them pedestrian friendly. The research data were obtained through field surveys, interviews, and observations. Moreover, in-depth analyses of several government reports from The Royal Commission for Riyadh City and the Ministry of Municipal and Rural Affairs were conducted. Results show that Tahlia Street has wide physical aspects compared to Tabuk Street, making the former more vital than the latter. However, both streets lack some street infrastructure to protect pedestrians from weather conditions. Finally, the paper proposes to develop the current conditions of the physical characteristics of street scenes in order to improve the quality of the streets in Riyadh and enhance the residents' quality of life.

Keywords:

Livable, streets, physical, urban design, quality of life, Riyadh, Saudi Arabia

خصائص الشوارع الحيوية: دراسة الجوانب المادية لشارعين في الرياض

الملخص

تعتبر مدينة الرياض واحدة من العواصم الرئيسية في العالم، وقد تأثر نسيجها العمراني بالتوسع الحضري والنمو السكاني السريع. لقد كان للتوسع العمراني الهائل آثار سلبية على البعد الإنساني، حيث أصبحت الشوارع موجهة للنقل بدلا من أن تكون فراغات عمرانية متكاملة. عملت أمانة بلدية الرياض على إعادة الإعتبار للبعد الإنساني للشوارع من خلال تطوير الفراغات العمرانية والبيئة المبنية المحيطة. ومع ذلك لم تتوصل هذه الجهود إلى إستراتيجية لإنشاء شوارع حيوية، لأنها بنيت على أساس من المبادرات الفردية. تهدف هذه الورقة إلى البحث في عمارة البيئة لشوارع مدينة الرياض وتحديد تأثيرها على جودة وحيوية الفراغات العمرانية. إعتمدت منهجية هذا البحث على التحليل الوصفي لشارعين في الرياض، هما شارع التحلية وشارع تبوك، اللذين تم تطويرهما لجعلهما شارعين صديقين للمشاة. لقد تم الحصول على بيانات البحث من خلال المسوحات الميدانية والمقابلات والملاحظات الشخصية. علاوة على ذلك، تم تحليل العديد من التقارير الحكومية من الهيئة الملكية لتطوير الرياض ووزارة الشئون البلدية والقروية. تشير نتائج هذ البحث أن شارع التحلية يتميز بالعديد من الجوانب المادية مقارنة بشارع تبوك، مما يجعله أكثر حيوية من شارع تبوك. ومع ذلك، يفتقر كلا الشارعين إلى بعض عناصر البنية التحتية لحماية المشاة من الظروف الجوية لمدينة مثل مدينة الرياض. أخيراً تقترح هذه الورقة تطوير الخصائص المادية للشوارع من أجل تحسين جودة الشوارع وتعزيز نوعية حياة السكان في مدينة الرياض.

الكلمات المفتاحية: حيوي، شوارع، تصميم عمراني، جودة الحياة، الرياض، المملكة العربية السعودية

INTRODUCTION

Urban spaces have dominant characteristics, such as the quality of the urban elements and activities in which they take place. These qualities consolidate the sense of urban space (Mahmoudi et al., 2015; Speiregen, 1965). Urban spaces, as an integral part of the city's spatial structure, consist of two basic formats: the square and the street (Krier, 1979), and their functions distinguish these spaces from each other (Amin, 2008). The street plays a crucial role in constituting the life of the society and is essential in defining the cultural, social, economic and political functions of city. It is the first distinctive element that determines the character of a place (Ahmed, 2019). Many current studies have confirmed that social and physical problems have led to the deteriorating livability of the built environment. Studies have shown that most social problems emerge from the related physical problems (Hedman & Jaszewski, 1984; Mitchell, 2003; Low & Smith, 2006). In relation to this, the concept of livable streets involves improving the urban environment, the right of pedestrians, and safety levels in their respective areas (Appleyard, 1980)

In some countries, urban streets have been struggling for decades due to a wide range of problems. Although great amounts of money are spent annually on road construction and maintenance, there remains a lack of noticeable interest in creating attractive places for public life. Public life in the streets is an overlooked topic in the field of urban planning, as most studies have focused on how to accommodate vehicles (Safdie, 2018). As the streets became dedicated to servicing vehicles, this has affected the residents' ability to socialize with one another (Appleyard & Douglass, 2017). Researchers have pointed out that streets exemplify an important part of public spaces and are apparent as a public realm (Mehta, 2007; Jacobs, 1961; Appleyard, 1981). Jacobs (1961) and Appleyard (1981) were the first to establish the concept of “livability” in the late 1960s. They endeavored to improve and humanize the open spaces of modern cities by applying such a concept. They also highlighted the idea of livability, especially in the streets, as a fundamental aim to obtain a good urban environment (Mahmoudi et al., 2015; Madanipour et al., 1998; Soja, 1989; Davis, 1990).

Riyadh has grown from a small city with an organic layout to a megacity characterized by uncontrolled urban sprawl. In fact, one study has described Riyadh City as having unrestrained urban sprawl, rapid population growth, and universal dependence on automobile travel for all journeys (Al-Mosaind, 2018). Urban expansion was affected by the economic boom in 1970, during which new residential neighborhoods emerged to accommodate population growth (Alzamil, 2016). Doxiadis implemented its first Master Plan in the early 1970s. This Plan was built around the goals of accommodating the rapid rise in car traffic and horizontal expansion to absorb population growth (Al-Hathloul, 2017). The Plan was later placed to encourage only the automobile users, and other modes of travel, like walking and cycling, were not considered. As a result, the number of car users increased, directly and indirectly leading to many problems, such as traffic congestion, traffic accidents, poor conditions for pedestrians and cyclists, poor social relationships, and high levels of obesity. Urban design indicators are still below standard, where per capita green space does not exceed 0.9 square meters. Furthermore, the number of steps a person walks is less than 3,800 steps per day, which helped increase obesity rates (Quality of Life Program, 2017).

As a result of the significant deterioration of the built environment, the City has undergone a program called “Humanizing the City” in order to recreate a livable

cityscape (Bin Ayyaf, 2015). Many streets were developed by amending or constructing new sidewalks throughout the city and adding street elements, such as trees, benches, and plinths. These attempts were implemented to encourage walking and to create livable streets. However, these attempts were fragmented, random, and did not have an associated network. In short, these attempts were just limited to expanding the platform and adding some elements to the street. Yet, comprehensibly improving the built environment and creating livable streets require an integrated and not dispersed treatment. Therefore, the Council of Economic Affairs and Development identified a series of 12 programs to achieve the 2030 Vision. The Quality of Life 2020 Program focuses on making Saudi Arabian a highly livable city by developing the people's lifestyle and improving their quality of life (Quality of Life Program, 2017).

The current paper focuses on understanding the characteristics of livable streets by analyzing the case studies of two streets in Riyadh. Improving the urban environment in the streets is an important entry point in achieving the quality of life. The results of this paper can help improve current urban conditions in the streets and make them livable within the framework of Vision 2030.

1. RESEARCH PROBLEM

Riyadh City has witnessed significant urban growth during the past three decades as a result of urbanization and population growth. Riyadh's population increased from 1,389,500 people in 1987 to 6,506,700 people in 2017. The urban growth in Riyadh is characterized by horizontal spread, with the urban densities concentrated on the main roads (Royal Commission for Riyadh City, 2014). The total urban development area in Riyadh is 3,115 km^2, and the planned land area until 2017 is 1820 km^2, comprising 58% of the urban development area (Royal Commission for Riyadh City, 2018). Thus, the horizontal expansion of Riyadh has contributed to the dominance of vehicles over other means of transportation. Moreover, the streets became devoted to servicing vehicles and lost their function as livable streets.

2. RESEARCH OBJECTIVES

The purpose of this paper is to investigate the physical aspects of Riyadh's streetscapes and define their influences on the livability and quality of spaces. The paper also aims to determine whether the physical aspects of streetscapes can affect the livability of Riyadh's streets. To accomplish these aims, three issues will be discussed as follows:

i. The physical aspects that affect the livability and quality of streetscapes;
ii. The existing circumstances of the distinguishing physical characteristics of Riyadh's streetscapes; and
iii. The effective strategies to address the physical problems in order to promote the livability and quality of Riyadh's streets.

3. LITERATURE REVIEW

3.1 Livable Streets

The livability concept can be traced back to the latter decade of the 20th century (Appleyard, 1981; Jacobs & Appleyard, 1987; Davis, 1990; Bosselmann et al., 1999). The concept of “livability” includes many planning contexts, such as transportation, community development, and quality of life. Researchers at that time have criticized

the various problematic features of urban spaces, such as noisy, substandard quality, and polluted environments. Jacobs and Appleyard (1987) emphasized the concept of livability as one of the objectives of obtaining a high quality and livable urban environment. Their main goal was to optimize the quality of urban spaces in the modern cities (Bandar & Shahcheraghi, 2012). The principles of livability focus on providing multiple transportation options, affordable housing, economic competitiveness, community development, alignment of local policies, and upgrading the residential environment (Herrman & Lewis, 2017).

Appleyard discovered the negative effects of traffic noise and speed on the quality drop of residents' quality of life (Appleyard & Lintell, 1972). Livable streets were discussed by Appleyard in his book published in the early 1980s. He applied traffic calming techniques in numerous cities of the world to create more humanized urban environments in relation to the continued growth of traffic volume. Appleyard defined livable streets as those that place more concern and focus on pedestrians and cyclists compared with traditional urban streets, thus resulting in such streets being used equally by everyone. However, the concept of livable streets is not just limited to providing a safe and pedestrian-friendly environment. The concept of viable streets also includes creating an urban environment that supports human interaction with the environment in a manner that facilitates mental, psychological, and physical development (Appleyard B. , 2017). The livable streets consist of the following principles:

- Streets as a safe space
- Streets as a healthy and livable environment
- Streets as a community
- Streets as a friendly territory
- Streets as a place for learn and play
- Streets as green spaces
- Streets as a unique historic place

After Appleyard's studies, several works investigated street uses and street life from diverse perspectives. For example, Bosselmann et al. (1999) examined the street livability by comparing livable streets with traditional ones. Dumbaugh and Gattis (2005) studied the level of safety in streets. Mesbahul Tariq (2007) showed the effects of traffic on users' choice of commute mode on Morden City and demonstrated the effects of traffic calming on walkable streets and connection encouragement. Sauterand Huettenmoser (2008) examined traffic management and presented the great potential of having a good quality social life by having peaceful streets. Layne (2009) clarified how landscapes are developed for public spaces and reported that environmental factors can bolster interactions between different communities. Tilaki et al. (2014) exhibited how friendly environmental designs can boost the livability of cities and revealed the considerable effect of the physical elements on the users' sense of space and apperception of distinguished identities. Vuchic (2017) discussed the consequences of immoderate automobile dependence and concluded that the most livable cities have an intermodal system that balance highway and public transit modes while also providing for pedestrians and bicyclists. He also defined the policies necessary for realizing livable cities. Whitney et al. (2020) discussed that livable streets are part of a competitive city economic development strategy of appropriating convenience into a planning system that promotes neighborhoods with the extreme economic potential.

The reviewed studies above are based on worthy assessments of livable streets from various viewpoints. Yet, each and every one of these studies only examined some of

the effective factors of livable streets and quality, assuming that all other physical aspects are identical. In order to fill this gap in the literature, this study seeks to identify the physical aspects that influence the livability and quality of streetscapes. Consequently, the scope of this research is limited to the physical aspects, while the concept of livability aims to provide a better understanding of the diverse social and functional aspects of urban spaces.

3.2 Physical Aspects of Streetscapes

The physical aspects that influence the design and livability of streets were selected by studying the published works between 1975 and 2018. As presented in Table 1, the reviewed references were designated among the distinguished and widely quoted urban space studies. As the literature has not yet matured on the same aspects, the current research classified and combined the most important studied aspects of livable streets. The chosen aspects of this framework were the most commonly mentioned aspects by several references, as presented in Table 1. Depending on the literature, some aspects (street segment length, retail facade, number of doors on the street, street greenery, and facilities for disabled) that were not studied extensively were also included in this study as insights for future works. The relevant studies are listed in Column II of Table 1. Finally, 10 aspects each with four levels were designated to represent the micro street-scale built environment for walking.

Table (1). The Physical Characteristics of Livable Streets

Aspects	Related literature	Description	Levels
Street segment length	Dijkstra and Timmermans, 2002; Zhu and Timmermans, 2011	The length of one street segment from one intersection to the next intersection	4 = Shorter than 100 m 3 = 100 m to 200 m 3 = 200m to 300 m 1 = More than 300 m
Retail shops in the facade of streets	Dijkstra and Timmermans, 2002; Kurose et al., 2009; Zhu and Timmermans, 2011; Guo and Loo, 2013; Borgers and Timmermans, 2015	The proportion of the street front occupied by retail shops	4 = 100% of retail shops 3 = 50% of retail shops 2 = 25% of retail shops 1 = No retail shops
The average number of doors on the street	Gehl, 2013; Alfonzo et al., 2014; Sun et al., 2017;	The average number of doors that opened at the frontage of retail shops	4 = 15–20 doors per 100 m 3 = 10–14 doors per 100 m 2 = 6–10 doors per 100 m 1 = less than 5 doors per 100 m
Crossing facilities	Dijkstra and Timmermans, 2002; Zhu and Timmermans, 2011; Guo and Loo, 2013; Kim et al., 2014; Sun et al., 2017; Mehdizadeh et al., 2018	The facilities at a street crossing, containing traffic lights and zebras	4 = Lights and zebras 3 = Only zebras 2 = Only lights 1 = No pedestrian crossing facilities
Width of the sidewalk	Guo and Loo, 2013; Kim et al., 2014; Sun et al., 2017	The actual width of the pedestrian pavement can be used	4 = Wider than 3.5m (over four persons in parallel) 3 = 3.5 to 1.5m (three to four persons in parallel) 2 = less than 1.5m (two persons in parallel at most) 1 = No sidewalk
Street greenery	Clifton et al., 2007; Kim et al., 2014; Rodriguez et al., 2015; Sun et al., 2017	The plants on the street containing trees and green areas	4 = Trees and green areas 3 = Only green areas 2 = Only trees 1 = No green areas and trees
The density of street lamps	Kelly et al., 2011; Gase et al., 2015; Moniruzzaman and Paze, 2016; Sun et al., 2017	The distance between two lamps in a street segment	4 = Less than 15m 3 = Between 15 and 30m 2 = More than 30m 1 = No lamps
Seating	Pushkarev and Zupan, 1975; Rubenstein, 1992;	The seats along the street in which people can take a break	4 = Less than 150m 3 = Per 150m

	Marcus and Francis,1998; Shaftoe, 2008; Gehl, 2013		2 = More than 150m 1 = No seats
Shelter and canopy	Francis, 1991; Rubenstein, 1992; Forsyth et al., 2008; Gehl, 2013	The means of protection against bad climate containing arcades, canopies, and trees	4 = Along street 3 = Less than 150m 2 = Per 150m 1 = No ones
Facilities for disabled people	Lynch, 1981; Mahmoudi et al., 2015	Facilities that help disabled people to move, containing curb ramps, railings and handrails, even surfaces and signage	4 = All facilities are available 3 = Half facilities are available 2 = Less than half facilities are available 1 = none facilities are available

Evaluation level: 4 = very good, 3 = good, 2 = bad, 1= very bad is based on the researcher's own assessment to the physical aspects and is not based on a comparison to any standards.

Source: The Authors

4. RESEARCH METHODOLOGY

The qualitative approach was adopted, because the specified aspects cannot be quantitative as the spatial design of sidewalks differs significantly. The varieties of users and usage differ temporally and spatially (Elsawy et al.2019). Thus, examining the physical aspects by creating a thorough set of criteria for assessing the physical conditions of livable streets can help determine its level of success for realizing a suitable livable environment. The research methodology employed observations to the physical aspects of the environment, and with the use of measurements. The research methodology did not include behavioral mapping or documenting users' behavioral patterns. The observations took place at daytime whereas observations in the evening hours and at night might yield different results due to the harsh weather conditions in the day time. The analysis is based on the measurement of urban criteria deduced from the literature in accordance with the researchers' observations; it is not based on the assessment or the opinion of the public street users. This study contains 10 aspects, each consisting of four levels (4 - very good, 3 - good, 2 - bad, 1- very bad). These aspects were applied to examine streets in the case study. The levels indicate the conditions of street. Observation is used in this study, because it is one of the most applied research techniques used in most recognized urban space studies, such as Gehl (2001), Mehta (2007), and Biddulph (2012). The immediate observations and accurate studies of the physical aspects of the studied streets were conducted by making field notes and taking photos. Data were compiled while these were conducted, and every examined aspect was recorded and classified into a table, thus creating a database for examining each aspect identified in the current work.

5. CASE STUDY

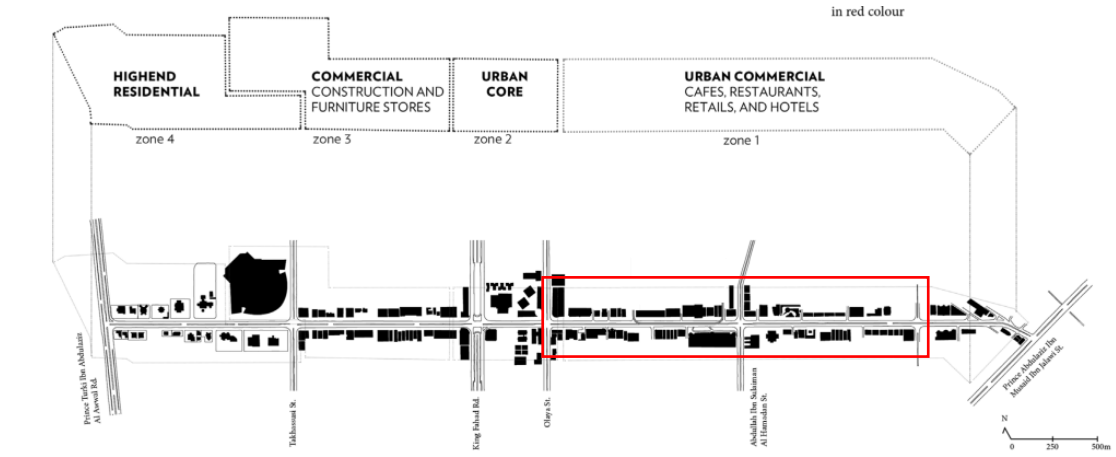
The Riyadh Municipality carried out an ambitious urban campaign program called "Humanizing the City" which targeted the improvement of pedestrian conditions and conversion of Riyadh to a pedestrian-friendly city. The reformation work concentrated on providing pedestrians' basic needs by expanding sidewalks and rising tree awning covers as well as plinths and outdoor seating to make a safe and convenient environment for pedestrians (Riyadh Municipality, 2008). Moreover, this initiative aimed to improve the quality of life, enhance the urban landscape, and implement universal access standards. Two representative streets developed by the Riyadh Municipality were chosen to investigate the physical characteristics of livable streets in the current study: Tahlia Street became a pedestrian attraction, while Tabuk Street did not have the same outcome after it was developed. The streets were selected based on four key reasons:

- These streets were chosen by the municipality to improve their conditions;

- One of them had a successful experience in the development process, while the other did not, and we wanted to know the physical aspects that led to these outcomes;
- Their multifunctional aspects; and
- Ease of access for the researchers and their suitability for the study.

Tahlia Street was selected by the Riyadh Municipality to be a paradigm for the new urban commercial street in Riyadh City. The whole street length is 5 km east to west with a width of 60 m, containing a broad sidewalk of 15 m on each side. As shown in Figure 1, the Street can be classified into four zones: (zone 1) the eastern half of Al Tahlia Street, which is a commercial urban area where most of the coffee shops and restaurants are located; (zone 2) the middle section passes through the urban center of Riyadh where there is a concentration of high-rise office blocks; (zone 3) the mid-west section is a commercial area with construction and furniture stores; and (zone 4) is the western end of the street, which is an expensive residential area (Almahmood et al., 2018).

Zone 1 was chosen, and its physical characteristics were studied because it almost resembled Tabuk Street in length and usage. The Street has become a main attraction for a wide range of visitors who come to the Street to do many things like walk, eat, meet friends, and go shopping, and this was achieved by balancing traffic and pedestrian movements in addition to encouraging restaurants and coffee shops to open along the Street and use the broad sidewalk for outdoor seating (Bin Ayyaf, 2015).



Zone 1 with land use

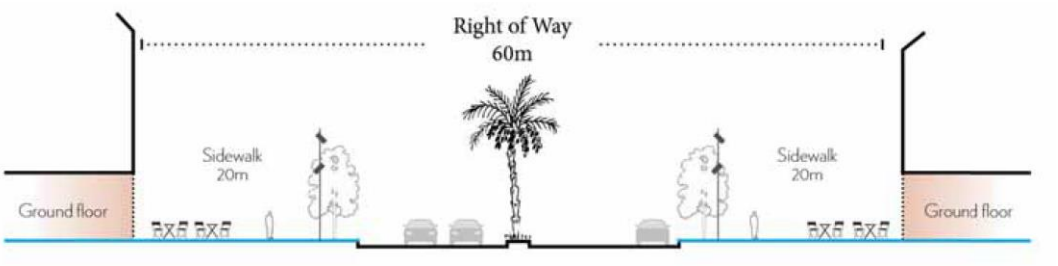


Figure (1). Al Tahlia Street with four zones
Source: Almahmood et al, 2018.

Tabuk Street is located in the northern part of Riyadh City with a length of about 1 km and a width of approximately 36 m. In Riyadh, the city streets in the planned areas are classified as commercial streets if they are equal to or over 30 meters. Most of the plots of land on the Street have a width and depth of 30 m and 30, respectively. As shown in Figure 2, Tabuk Street is not a motorway, which gives it an added advantage in terms of the possibility of development and improvement without disrupting traffic. Furthermore, Tabuk Street is characterized as one of the streets that have been developed by the Riyadh Municipality to create a comfortable environment for pedestrians.

Figure (2). Tabuk Street with land use
Source: Alskait,2019.

6. ANALYSIS OF TAHLIA STREET CASE STUDY

The physical characteristics of the built environment along Tahlia Street were measured during the observational valuation by the researchers. Table 2 and Figure 3 summarize the descriptive analysis of the physical aspects of Tahlia Street. The street segment length is good, ranging between 100 m and 200 m. There are some street segments that are over 300 m, while there are some that are less than 100 m. The retail shops found on the street facade are all very good, because land use has been allotted for commercial purposes. In fact, the Street is classified as a commercial street and even

the ground floors of all buildings are used for commercial activities. The average number of doors is good at 11 doors per 100 m. There are some buildings that use the ground floor for one activity and therefore use just one door. The crossing facilities are very good, but they need continuous maintenance. The width of the sidewalk is also very good at approximately 15 m in width.

The sidewalk is enough to accommodate over four persons in parallel. However, street greeneries are below expectations, because the Street contains some trees that do not provide shaded areas. Moreover, green areas are not available, and most of the surfaces are covered with concrete tiles. The density of street lamps is good, as the distance between two lamps is 20 m. Generally, plinths are distributed along the Street without pergolas, while seats are only available in front of the restaurants. The shelter and canopy are very bad, because the Street has no means of protection against bad weather, except some areas with trees that do not even provide shade. Finally, the facilities for disabled people are not up to standard, as there are few ramps for the disabled. Some shops also have stairs in front, which impede the movement of the handicapped.

Table (2). Evaluating the livability of Tahlia Street

Aspects	Analysis of Street	Evaluation	Photos
Street segment length	Most segment lengths range from 100 m to 200 m.	**(3)**	
Retail shops on the street facade	The street is classified as a commercial street, so retail shops extend along the street.	**(4)**	
The average number of doors on the street	The average number of doors on the street is 11 doors per 100 m.	**(3)**	
Crossing facilities	The traffic lights and zebras are available at the street crossing.	**(4)**	
Width of the sidewalk	The width of the sidewalk is approximately 15 m.	**(4)**	
Street greenery	The street contains some trees only, and these aren't shaded trees. Green areas are not available	**(2)**	

The density of street lamps	The general distance between two lamps in the street is 20 m.	**(3)**	
Seating	The seats are only available in front of restaurants, while the plinths are spread out along the street.	**(3)**	
Shelter and canopy	There are some non-shaded trees on the street, and arcades and canopies are not available on the street.	**(1)**	
Facilities for disabled people	There are some curb ramps in some places. Street surfaces are flat.	**(2)**	

Evaluation level: 4 = very good, 3 = good, 2 = bad, 1= very bad is based on the researcher's own assessment to the physical aspects and is not based on a comparison to any standards.
Source: The Authors

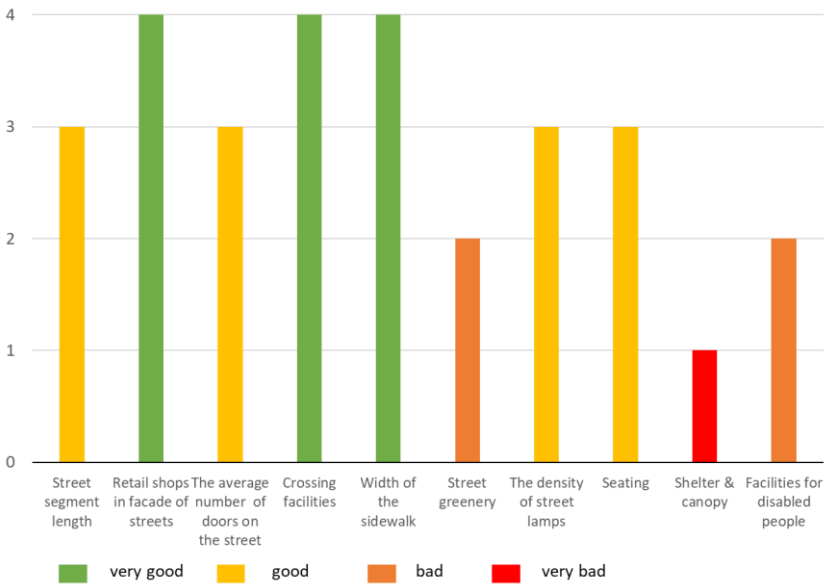


Figure (3). Evaluating the livability of Al Tahlia Street
Source: The Authors

7. EVALUATING THE LIVABILITY OF TABUK STREET

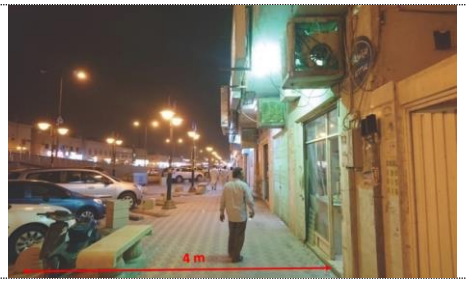
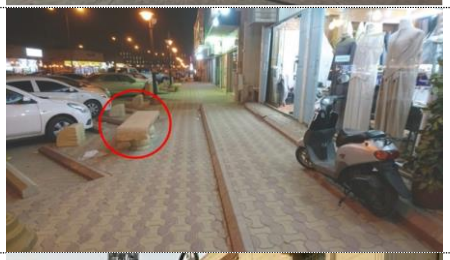
For comparison, the physical characteristics of the built environment along Tabuk Street were measured during the observational valuation by the researchers. Table 3 and Figure 4 summarize the descriptive analysis of the physical aspects along Tabuk Street. The street segment length is good ranging between 100 m and 200 m. However,

there are some street segments that are less than 100 m. The retail shops found on the facade of the Street are very good, as land use is planned for commercial purposes. It is classified as a commercial street, and the ground floors of most buildings are used for commercial activities. There are some buildings that use the ground floor for just one activity and therefore use only a single door. The crossing facilities are very bad, because the traffic lights and pedestrian lines are not available at the street crossing.

The width of the sidewalk is very good at approximately 4 m. The sidewalk is enough to accommodate over four persons in parallel. The street greenery is very bad, because there are no trees found. Moreover, green areas are not available, and most of the street surfaces are covered with concrete tiles. The density of street lamps is very good, as distance between two lamps is 10 m on average. The seats are not available, and plinths spread out along the length of the Street. In addition, shelter and canopies are very bad, because Tabuk Street has no means of protection against bad weather. There are no arcades, canopies, and shaded trees. Finally, the facilities for disabled people are very bad, as there are no any ramps, railings, signage, and handrails that can help disabled people move about.

Table (3). Evaluating the livability of Tabuk Street

Aspects	Analysis of Street	Evaluation	Photos
Street segment length	Most of the segment length ranges from 100 m to 200 m.	**(3)**	
Retail shops on the street facade	The street is classified as a commercial street, so retail shops extend along the street.	**(4)**	
The average number of doors on the street	The average number of doors on the street is 10 doors per 100 m.	**(2)**	
Crossing facilities	The traffic lights and zebras are not available at the street crossing.	**(1)**	

Width of the sidewalk	The width of the sidewalk is approximately 4 m.	**(4)**	
Street greeneries	There are no trees or green areas on the street.	**(1)**	
The density of street lamps	The distance between two lamps in the street is 10 m.	**(4)**	
Seating	The seats are not available on the street, and plinths spread out along the street.	**(2)**	
Shelter and canopy	There are no shaded trees, arcades, and canopies on the street.	**(1)**	
Facilities for disabled people	Facilities for disabled people are not available on the street.	**(1)**	

Evaluation level: 4 = very good, 3 = good, 2 = bad, 1= very bad is based on the researcher's own assessment to the physical aspects and is not based on a comparison to any standards.

Source: The Authors

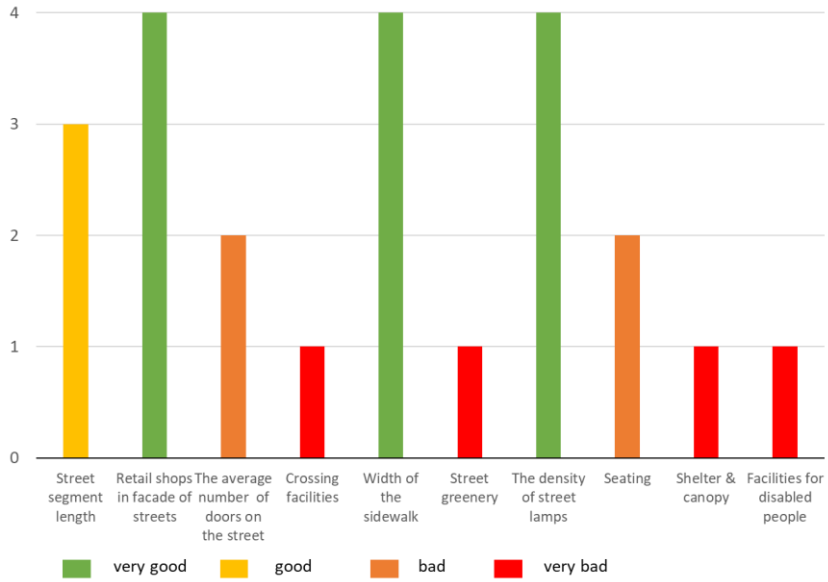


Figure (4). Evaluating the livability of Tabuk Street
Source: The Authors

8. CONCLUSION

This paper evaluated the physical characteristics of two streets in Riyadh within the framework of the concept of livable streets. There are many urban aspects that enhance the livability of streets, such as the length of the street, the type of commercial activities, crossing facilities, width of the sidewalk, and facilities for the disabled. Moreover, livable streets are affected by the availability of street greeneries, sufficient lighting, shaded areas, and seating areas. The results showed variations in the physical characteristics of the streets, which affect their livability. Tahlia Street is more lively compared to Tabuk Street, because it contains multiple urban elements, such as the diversity of commercial activities, sidewalks, and pedestrian facilities. However, both streets lack facilities for the disabled, street greeneries, and adequate seating. These results can thus help decision-makers and local municipalities in developing the urban environments for pedestrian streets in Riyadh within the framework of humanizing cities.

As a recommendation, the following aspects also need to be considered:

1. Developing a strategy to improve the urban environment for pedestrian streets in Riyadh by enhancing community participation and analyzing the current situation;
2. Diversifying commercial activities in pedestrian streets and linking them to a public transport network;
3. Improving urban spaces and providing street furniture elements, such as smart lighting, seats, green areas, and ramps for the disabled, which can help increase vitality;
4. Providing pedestrian protection from vehicles in the form of traffic lights, pedestrian lines, and speed reducers;
5. Providing means of protection against bad weather, including arcades, canopies, and trees for Al Tahlia Street and Tabuk Street;

6. Improving the urban environment for pedestrians in Tabuk Street and providing facilities for the disabled, street greeneries, and adequate seating;
7. Increasing the percentage of green spaces along the pedestrian street paths to improve climatic conditions; and
8. Conducting assessments based on the street users' and pedestrians' evaluation in future studies to compare against the findings of this research.

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