Factors Behind Urban Social Space for Sustainable Urban Development: A Case of Bangkok, Thailand

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ABSTRACT

Urban social spaces play a key role in sustainable urban development. Recently, several studies have highlighted key issues in urban areas, particularly the impact of socio-spatial aspects on urban sustainability. In Thailand, little is known about the socio-spatial aspects in urban areas. Hence, this study aims to investigate the key factors shaping urban social spaces for sustainable urban development in Bangkok, Thailand. A questionnaire survey is conducted among urban residents in Bangkok (n=1 0 0). Socio-spatial indicators of the social sustainability framework are applied in this study. The data are analyzed using confirmatory factor analysis (CFA) to investigate the key measurement indicators of sustainable urban development in Bangkok, Thailand. The CFA revealed key determinants across multiple socio-spatial dimensions, with particularly strong contributions from social interaction with neighbors (λ = 0.94), community participation (λ = 0.93), essential utilities (λ = 0.91), perceived safety (λ = 0.89), and facilities for children (λ = 0.89). The findings could be key takeaways for consideration in social space design by enhancing social interaction, community participation in municipal decision-making, engaging vulnerable groups, and targeted neighborhood-level social infrastructure to respond to social equity, environmental equity, and sustainability of communities for sustainable urban development.

Keywords: Urban Social Space/ Sustainable Urban Development/ Bangkok/ Thailand

1. INTRODUCTION

Cities play an important role in economic development worldwide [1-3]. Globally, the urban population is projected to increase by almost 70% by 2050 [2]. Further, rapid urbanization, economic development, social inequality, and climate change remain the key challenges in the 21st century [1-3]. Urban growth has been occurring in developing countries, particularly in Africa and Asia [3]. In developing countries, 52% of the population resides in urban areas, a share expected to rise to 66% by 2050 [3]. In Asia, two-thirds of the population is expected to live in urban areas by 2050 [3]. Further, poor urban governance is the main challenge in this region [3,4]. Economic, social, and environmental factors should be considered for sustainable urban development to balance economic growth, social well-being, and environmental sustainability [5]. Hence, urban social space is a necessary factor to enhance human well-being in the city [5,6]

Urban social space is a key concept in social geography for understanding the inequality among urban residents amid the diversity of people, spaces, and power in urban areas [5,7-8]. Urban social space illustrates the interaction of social activities and space among urban dwellers [5]. A versatile urban social space is necessary for measuring the state of sustainable development [5-6]. It needs to understand the key measurement indicators of urban social space [5] to ensure the social sustainability in the urban society [5,7]. Social sustainability comprises social equity, social cohesion, basic needs, cultural integration, etc. These aspects aim to address social inequality and enhance the well-being of urban residents [5,7].

Recently, global studies highlight the key problems in urban areas, especially the impact of socio-spatial aspects on urban sustainability [7], socio-spatial dynamics in crime prevention [9], socio-spatial constraints and facilitators of racially and ethnically diverse park visitation [10], socio-spatial aspects contributing to a sense of pride in urban neighborhoods [11], and planning for urban livability: integrating socio-spatial indicators in city-making [12]. In Bangkok, Thailand, few studies have

explored the socio-spatial aspects and social space while mainly focusing on qualitative studies [13-17]. Further, there is a lack of studies on a suitable model for developing urban social space under a social sustainability framework.

Bangkok is one of the cities in Southeast Asia with rapid urban growth and urbanization. Urban-rural migration is still taking place, and population density has been increasing. However, social space in Bangkok is still limited, non-versatile, and unequal access due to poverty and uneven economic development in the city. Although the green space has expanded in the last few decades, other social spaces are not being paid attention to [18-21]. Thus, socio-spatial indicators are necessary to assess the states of social sustainability in Bangkok to understand the key measurement indicators for a good development model for social space under social sustainability

To address these gaps, this study aims to investigate key measurement indicators of urban social space under a social sustainability framework for contributing to sustainable urban development in Bangkok, Thailand. Socio-spatial indicators of the social sustainability framework are adapted and examined by using confirmatory factor analysis (CFA) to select the key factors that contribute to sustainable urban development. This study will be useful for policymakers, policy practitioners, researchers, and civil society who are interest on social space development in urban areas. This study can be applied in other city where similar to Bangkok, in Thailand, to overcome the rapid urbanization and lack of versatile social space.

2. METHODOLOGY

2.1 Study Area

Bangkok, Thailand, is selected as the study area due to the rapid urban development. There is still a lack of concern about the socio-spatial aspects in urban development. Moreover, the social and environmental issues have been exposed in Bangkok over the last decade [13-21]. Hence, this study aims to address the socio-spatial aspects to fill the gaps of urban development in Bangkok in transition toward sustainable urban development (Figure 1).

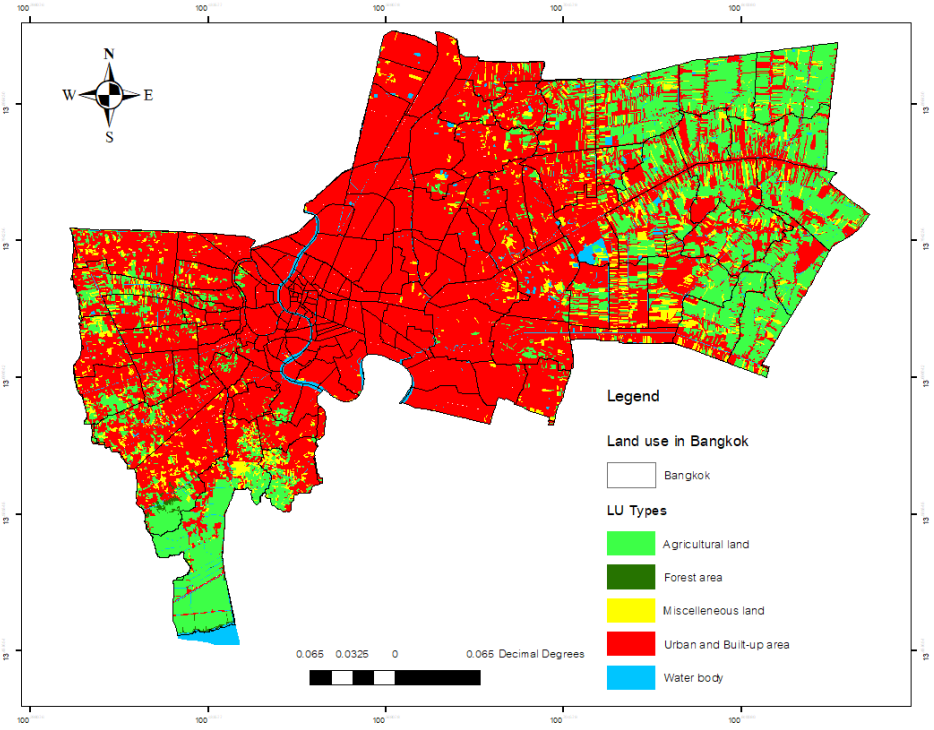


Figure 1. The Study area: Bangkok, Thailand (Data Source: LDD (2023))

2.2 Data and Variables

Data are retrieved from an online questionnaire survey, i.e., demographic characteristics: sex, age groups, highest level of education, marital status, children in the household, residence types, residence owner, household members, year of residence, and average monthly income. Furthermore, socio-spatial indicators within the social sustainability framework are selected from the existing literature to investigate the key measurement indicators of urban social space in Bangkok.

Table 1. Socio-spatial indicators under the social sustainability framework

Aspects	Dimension	Indicators
Social equity	Accessibility	Walkability
		Transportation options
		Easy access to the area
	Social Facilities	Recreational facility
		Sport facility
		Youth facility
		Children facility
		Women/girl facility
		LGBTQA+ facility
	Daily Operations	Shopping
		Utility services
		Leisure services
		Commercial service
Environmental equity	Open Spaces	Open space
		Green area
		Diverse use
		Different needs
		Vulnerable
		Hygiene
		Day & night visit
Sustainability of community	Attachment	Belonging to neighborhood
		Pride
		Lifestyle
		Identity
	Sense of Neighborliness	Recognize of neighbor
		Knowing neighbor
		Friendship
		Value of neighbor
	Social Relations	Say Hi
		chatting
		Visit other home
		Go shopping
		Going open space
		Leisure neighbor
		Attend cultural activities
	Sense of Safety	Safety for pedestrian
		Safety in daylight
		Safety in night
		Safety for vulnerable
	Participation	Participation in civic
		Participation in decision
		Participation in urban

Source: Adapted from [5,7]

2.3 Data collection

2.3.1 Population and samples

The total population in Bangkok is 5,433,391 persons [22]. Sample size is calculated by using the Taro Yamane formula [23] at 90% confident level and 10% error (n = 99.99 samples). However, 100 samples are purposively selected in this study. The formula is;

$$n = \frac{N}{1 + N(e^2)}$$

$$n = \frac{5{,}433{,}391}{1 + 5{,}433{,}391(0.1^2)}$$

$$n = 99.99$$

2.3.2 Research tool

Questionnaires are designed based on the research objectives, including demographic characteristics of respondents, socio-spatial indicators under the social sustainability framework, and other recommendations. Then, a pilot study (n = 30) is conducted, and reliability analysis is used to assess the reliability of the questions. The result shows Cronbach's Alpha ($\alpha = 0.98$), which passes the threshold ($\alpha = 0.7$). Hence, the questionnaire is a reliable tool and was distributed to the whole sample.

2.3.3 Sampling method

Purposive sampling is conducted in this study. The 100 samples are purposively selected through an online questionnaire, based on the criteria: 1) residing in Bangkok or 2) working in Bangkok, to understand the key measurement indicators of urban social space in the study area.

2.4 Data analysis

Data were input and verified before the analysis process. Data were analyzed by descriptive statistics (percentage, mean, s.d.) to present the demographic characteristics of respondents and resident characteristics. Then, the ADANCO program is used to model the Partial Least Squares Structural Equation Modelling (PLS-SEM). Confirmatory Factor Analysis is applied to examine the key measurement indicators of the socio-spatial indicators of social sustainability in Bangkok. The CFA model has proved its validity and reliability to customize the best fit of the model. PLS-SEM provides model fit indices as d_ULS (squared Euclidean distance), d_G (geodesic distance), and SRMR (Standardized Root Mean Squared Residuals) [24-25]

3. RESULTS AND DISCUSSION

3.1 Results

3.1.1 Demographic characteristics of Respondents

Table 2 presents the respondents' demographic and resident characteristics. It is found that most of them are female (76%), in the age group between 18-29 years old (77%), with a Bachelor's degree (71%), and are single (93%), with no children (93%). Most of the resident types are house (38%) and apartment (30%), while 57% are resident owners. Meanwhile, Table 6 shows that the average household members are 4.30 persons (4 persons/household), the average year of residence is 8.29 years, and the average monthly income is 23,640 THB.

Table 2. Demographic characteristics of respondents

Variables	Frequency (Percent)
Sex	
Male	18 (18 %)
Female	76 (76 %)
LQBTQA+	6 (6 %)
Age Groups	
18-29	77 (77 %)
30-39	21 (21 %)
40-49	2 (2 %)
Highest level of Education	
High School	6 (6 %)
Bachelor Degree	71 (71 %)
Master Degree or higher	23 (23 %)
Marital status	
Single	93 (93 %)
Marriage	4 (4 %)
Divorce	3 (3 %)
Children	
None	93 (93 %)
One	4 (4 %)
Two	3 (3 %)
Residence Types	
House	38 (38 %)
Townhome	14 (14 %)
Apartment	30 (30 %)
Condominium	18 (18 %)
Residence owner	
Owner	57 (57 %)
Rent	43 (43%)

Table 3. Mean and Standard Deviation of demographic characteristics

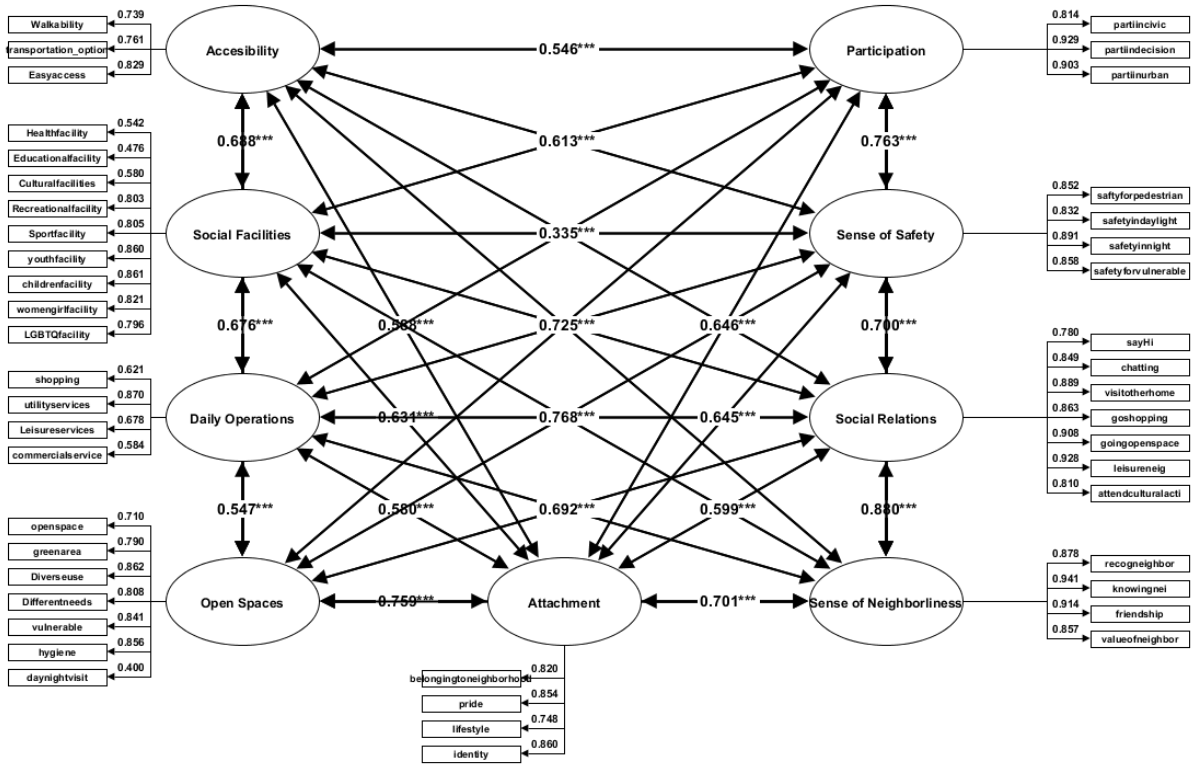
Variables	Mean	S.D.
Household members (persons)	4.30	1.85
Year of residence (years)	8.29	8.21
Average monthly income (THB)	23,640	19,817.77

3.1.2 Urban Social Space Model in Bangkok

Figure 2 illustrates the developing model of the Urban Social Space Model in Bangkok. Table 4 Factor Loading and Construct Validity in the model, while Table 5 shows the Fornell-Larcker Criterion, which passes the criterion. The square root of its Average Variance Extracted (AVE) is greater than its highest correlation with other constructs. It is found that key measurement indicators can explain the principle of good urban social space as follows;

1) Accessibility is the highest explained by easy access to the area ($\lambda = 0.83$).
2) Social Facilities is the highest explained by facility for children ($\lambda = 0.89$) and youth ($\lambda = 0.88$).
3) Daily Operations is the highest explained by utility services ($\lambda = 0.87$).
4) Open Spaces is the highest explained by diverse use ($\lambda = 0.86$) and hygiene ($\lambda = 0.86$).
5) Attachment is the highest explained by identity ($\lambda = 0.86$) and pride ($\lambda = 0.85$).
6) Sense of Neighborliness is the highest explained by knowing neighbor ($\lambda = 0.94$) and friendship ($\lambda = 0.91$).
7) Social Relations is the highest explained by leisure neighbor ($\lambda = 0.93$) and going to open space ($\lambda = 0.91$).

8) Sense of Safety is the highest explained by safety at night (λ = 0.89) and safety for the vulnerable (λ = 0.86).
9) Participation is the highest explained by participation in decision (λ = 0.93) and participation in urban (λ = 0.90).



Note: * p<.05, ** p<.01, *** p<.001; SRMR = 0.085, dULS = 6.52, dG = 3.24

Figure 2. Urban Social Space model in Bangkok

However, the lowest factor loadings are noticed in the model. These factors may not be considered in the Bangkok context due to the low performance in explaining the key dimensions. These low performance factors include;

1) Social Facilities are low explained by educational facilities (λ = 0.47), health facilities (λ = 0.54), and cultural facilities (λ = 0.58).
2) Daily Operations are lowest explained by commercial services (λ = 0.58).
3) Open Spaces is the lowest explained by day-night visit (λ = 0.40)

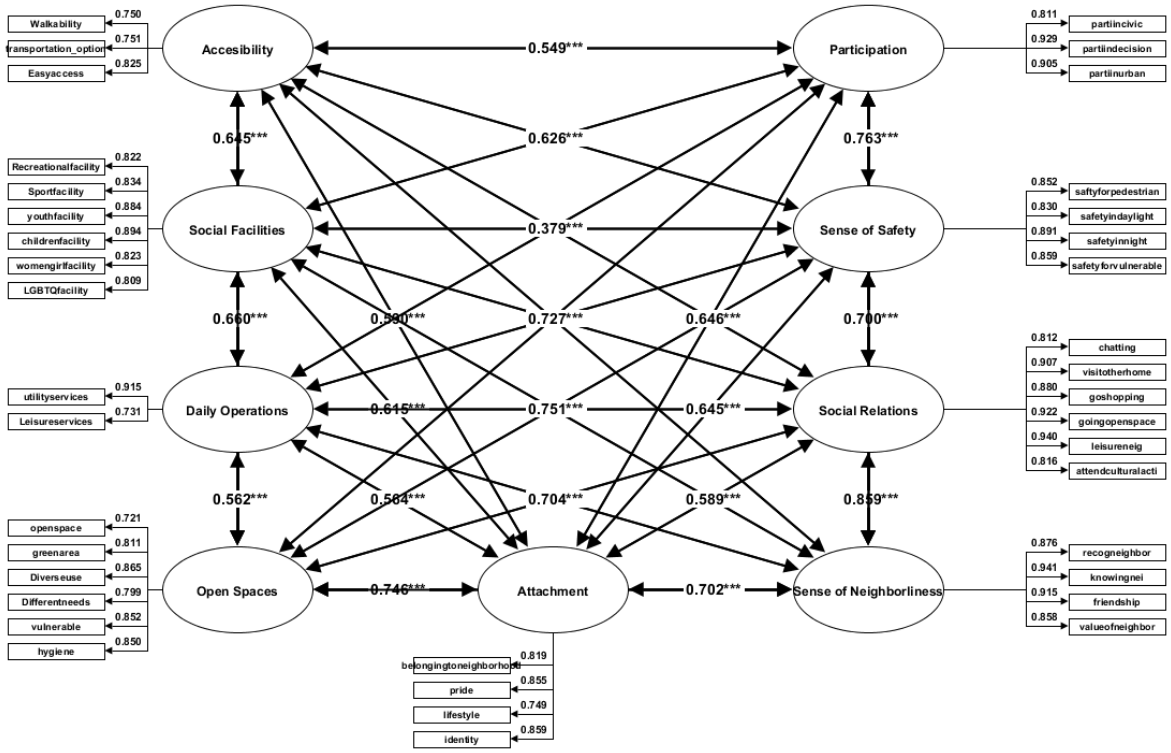
Table 4. Factor Loading and Construct Validity

Factors	Loading	AVE	Dijkstra-Henseler's rho (ρA)	Jöreskog's rho (ρc)	Cronbach's alpha (α)
Accessibility		0.60	0.67	0.82	0.67
Walkability	0.74				
Transportation option	0.75				
Easy access to the area	0.83				
Social Facilities		0.71	0.92	0.94	0.92
Recreational facility	0.82				
Sport facility	0.83				
Youth facility	0.88				
Children facility	0.89				
Women/girl facility	0.82				
LGBTQA+ facility	0.81				
Daily Operations		0.48	0.81	0.79	0.67
Shopping	0.61				
Utility services	0.87				
Leisure services	0.67				
Commercial service	0.57				
Open Spaces		0.58	0.90	0.90	0.87
Open space	0.71				
Green area	0.79				
Diverse use	0.86				
Different needs	0.81				
Opportunities for vulnerable groups	0.84				
Hygiene	0.86				
Day & night visit	0.40				
Attachment		0.68	0.84	0.89	0.84
Belonging to neighborhood	0.82				
Pride	0.85				
Lifestyle	0.75				
Identity	0.86				
Sense of Neighborliness		0.81	0.92	0.94	0.92
Recognize of neighbor	0.88				
Knowing neighbor	0.94				
Friendship	0.91				
Value of neighbor	0.86				
Social Relations		0.74	0.94	0.95	0.94
Say Hi	0.78				
chatting	0.85				
Visit other home	0.89				
Go shopping	0.86				
Going open space	0.91				
Leisure neighbor	0.93				
Attend cultural activities	0.81				
Sense of Safety		0.74	0.88	0.92	0.88
Safety for pedestrian	0.85				
Safety in daylight	0.83				
Safety in night	0.89				
Safety for vulnerable groups	0.86				
Participation		0.78	0.87	0.91	0.86
Participation in civic	0.81				
Participation in decision	0.93				
Participation in urban	0.90				

Table 5. Fornell-Larcker Criterion

Construct	1	2	3	4	5	6	7	8	9
Accessibility	0.6030								
Social Facilities	0.4160	0.7138							
Daily Operations	0.2579	0.2269	0.4840						
Open Spaces	0.4590	0.5210	0.3016	0.5894					
Attachment	0.3469	0.3779	0.3379	0.5759	0.6753				
Sense of Neighborliness	0.3200	0.3174	0.1984	0.5188	0.4919	0.8066			
Social Relations	0.2818	0.2686	0.1498	0.4792	0.3586	0.7747	0.7436		
Sense of Safety	0.3479	0.4282	0.1761	0.5888	0.4158	0.4439	0.4428	0.7368	
Participation	0.2999	0.3915	0.1137	0.5253	0.4170	0.4901	0.5036	0.5817	0.7804

Figure 3 presents the modification of the urban social space model in Bangkok. The low factor loadings are excluded to modify the model, while the goodness-of-fit indices have passed the threshold (SRMR = 0.07, dULS = 4.08, dG = 2.41). To develop a sustainable urban social space in Bangkok, Thailand, the following factors of each component are confirmed to be good factors to consider in the urban social space design. It is summarized according to the factor loadings of each factor (Table 6)



Note: * p<.05, ** p<.01, *** p<.001; SRMR = 0.07, dULS = 4.08, dG = 2.41

Figure 3. The Modification of Urban Social Space model in Bangkok

Figure 4 shows the key measurement indicators for prioritization to design urban social space in Bangkok, Thailand. There are three aspects of social sustainability to develop urban social space: social equity, environmental equity, and sustainability of the community.

1. The social equity includes accessibility, social facilities, and daily operation.
    1) Accessibility should comprise easy access to the area, transportation options, and walkability.

2) Social facilities should include Facilities for children, Facilities for youth, Sports facilities, Facilities for women and girls, Recreational facilities, and Facilities for LGBTQA+.
3) Daily operations should include utility services and leisure services.

2. The environmental equity includes open space that should be for diverse use or versatile public space for different purposes for urban residents, opportunities for vulnerable groups to access and use open space equally, open space should meet hygienic needs or be a clean area, green areas should be provided for all, respond to different needs of people, and provide adequate open space coverage in the city.
3. The sustainability of the community includes attachment, sense of neighborliness, social relations, sense of safety, and participation.
    1) Attachment should be prioritized to the identity of the social space where people can create arts, pride in the neighborhood due to good urban planning and management, belonging to the neighborhood, and representing the residents' lifestyle. These attachment components will take place; it should be cooperative among residents, municipalities, and related stakeholders to form a livable community.
    2) Sense of neighborliness should be included, neighbor knowing, friendship creation, recognition, and valuing their neighbor.
    3) Social relations should include leisure activities with neighbors, going to open spaces with neighbors, visiting each other's homes, going shopping together, attending cultural activities, and chatting when they meet. These are the key components to consider in urban social space planning to enhance social relations.
    4) Sense of safety should include safety at night, safety for vulnerable groups, safety for pedestrians, and safety in daylight. These are the key takeaways for consideration in social space design to respond to the sense of safety among urban dwellers.
    5) Participation should include participation in municipality decision-making, urban planning, and civic activities for strengthening good urban governance and redesigning urban social space through the lens of civil societies.

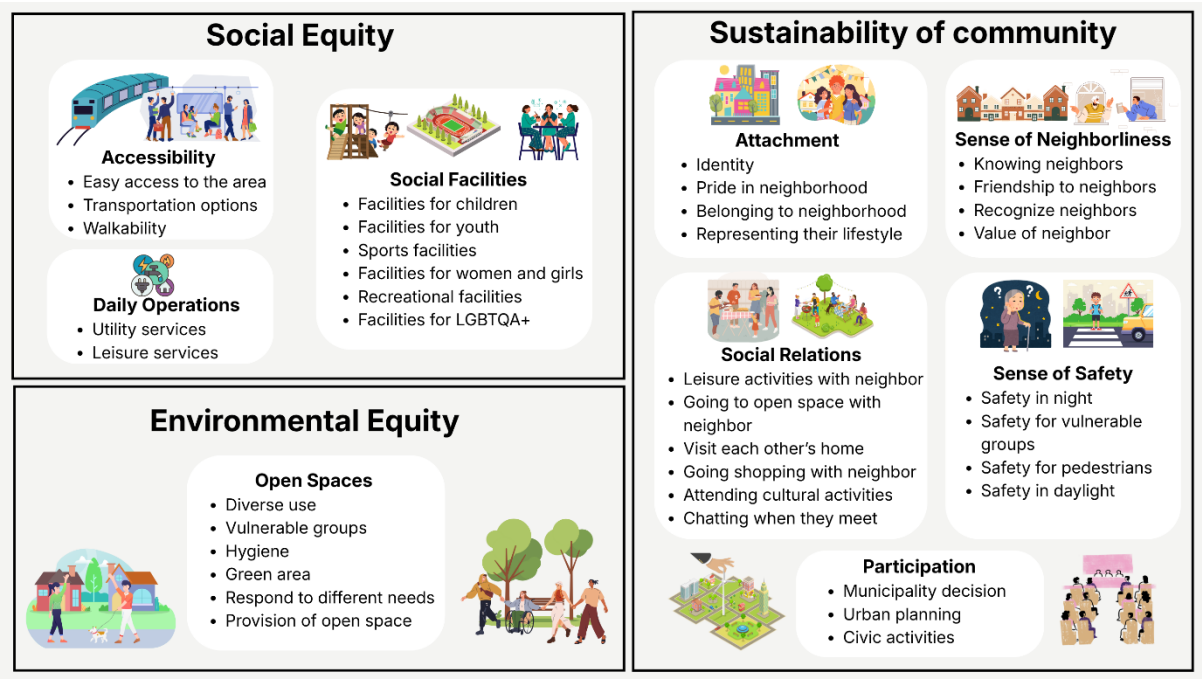


Figure 4. Key measurement indicators for prioritization to design urban social space in Bangkok, Thailand

3.2 Discussion

The developing model of the urban social space in Bangkok. The results highlight that multiple key measurement indicators can explain the principles of good urban social space. Hence, the urban social space planning in Bangkok, Thailand, should include these factors to design a suitable urban social space for the BKK citizen. Firstly, social equity encompasses accessibility, social facilities, and daily operations. Accessibility should comprise easy access to the area, transportation options, and walkability. The results suggest that the social space accessibility should be easy access for all urban residents, which provides opportunities for equality for all. The present result is in line with [26], who highlight that accessibility contributes to social inclusion for older adults and people with disabilities in barrier-free crossings, intermediate seating, noise reduction, and improved wayfinding. These can facilitate the vulnerable groups' use of public space safely and inclusively. In Islamabad, Pakistan, a rapidly urbanizing city, green space access is inequitable, and the system is non-functional. The findings call for the redistribution of green space and good management [27]. In Bangkok, Thailand, accessibility is the key challenges which transport network still inconveniences, causes discomfort, and raises safety concerns [28]. The urban design strategies should enhance walkability and cycling to improve accessibility through active modes of transportation [28]. Hence, it is necessary to redesign by reducing the street, pavement regeneration, reducing the cost of public transportation, green space expansion, and renovating the remaining buildings to a walking zone.

Social facilities should include facilities for children, facilities for youth, sports facilities, facilities for women and girls, recreational facilities, and facilities for LGBTQA+. Adequate pedestrian infrastructure and nearby facilities are essential for promoting children's social engagement and pediatric wellness [29]. Advocates for rights-based policies to ensure equitable access to community public spaces and recreational facilities, emphasizing that inclusive design and localized urban spaces act as tools to mitigate poverty-related inequalities for children [30]. Properly designed youth spaces are not just physical locations, but critical social infrastructure. They help young people build "socio-spatial" connections, strengthening their sense of belonging and civic identity within the broader community [31]. The need to include young people's voices in urban development to create safer, more inclusive, and highly utilized civic spaces [32]. Further, women, girls, and LQBTQA+ voices should be included in the policymaking process for developing urban social space or public space for gender equality, for example, enhancing safety and inclusion for women and girls in urban parks, setting up the visible queer flags in green spaces for symbolic representation, etc. [50-51]. These actions may improve the violence risks and enhance gender equality in urban areas [50-51]. Daily operations should include utility services, i.e., free drinking water, internet, electricity in public spaces, and leisure services activities, i.e., open library, open museum, etc., which are important in designing the urban social space to enhance the quality of life in terms of basic needs and leisure activities. [7]

Secondly, the aspect of environmental equity includes open spaces that should be for diverse use or versatile public space for different purposes for urban residents [6,33], opportunities for vulnerable groups to access and use open space equally [1-7, 9-14, 20, 29-32, 50-51] open space should meet hygienic needs or be a clean area [7, 34-35], green areas should be provided for all [27, 29-32, 50-51], respond to different needs of people [27, 29-32, 50-51], and provide adequate open space coverage in the city [1-6]. The good quality of open space can leverage the basic well-being among multiple groups of urban residents and indicate the good urban governance toward an inclusive city [4,6]. Thirdly, the sustainability of the community includes attachment, sense of neighborliness, social relations, sense of safety, and participation. Attachment should be prioritized to the identity of the social space where people can create arts, pride in the neighborhood due to good urban planning and management, belonging to the neighborhood, and representing the residents' lifestyle. These attachment components will take place; it should be cooperative among residents, municipalities, and related stakeholders to form a livable community [11,36]. Sense of neighborliness should be included, neighbor knowing, friendship creation, recognition, and valuing their neighbor. While physical spaces for casual

interaction are shrinking, the presence of well-designed shared spaces remains vital to maintaining a localized sense of community and strong neighborly ties [37]. Massive modern housing blocks alter social dynamics, often leading to more privatized, selective, or transactional neighborly interactions rather than the organic community ties seen in older neighborhood styles [38].

Meanwhile, social relations should include leisure activities with neighbors, going to open spaces with neighbors, visiting each other's homes, going shopping together, attending cultural activities, and chatting when they meet. These are the key components to consider in urban social space planning to enhance social relations [39-40]. A sense of safety should include safety at night, safety for vulnerable groups, safety for pedestrians, and safety in daylight. These are the key takeaways for consideration in social space design to respond to the sense of safety among urban dwellers [7, 41-46]. Further, participation should include participation in municipality decision-making, urban planning, and civic activities for strengthening good urban governance and redesigning urban social space through the lens of civil societies [7, 47-49].

4. CONCLUSIONS

The urban social space model in Bangkok is developed through the lens of Bangkok citizens. The results shed light on key measurement indicators behind the urban social space. Urban planning in Bangkok, Thailand, should include these factors to design an appropriate urban social space for urban residents. Based on data collection and data analysis in this study. Some conclusions were drawn as follows:

1. Social equity encompasses accessibility, social facilities, and daily operations. Accessibility should comprise easy access to the area, transportation options, and walkability. Social facilities should include facilities for children, facilities for youth, sports facilities, facilities for women and girls, recreational facilities, and facilities for LGBTQA+. Daily operations should include utility services, i.e., free drinking water, internet, electricity in public spaces, and leisure services activities, i.e., open library, open museum, etc., which are important in designing the urban social space to enhance the quality of life in terms of basic needs and leisure activities.

2. Environmental equity includes open spaces that should be for diverse use or versatile public spaces for different purposes for urban residents, opportunities for vulnerable groups to access and use open space equally, open spaces should meet hygienic needs or be a clean area, green areas should be provided for all, respond to different needs of people, and provide adequate open space coverage in the city.

3. The sustainability of the community includes attachment, sense of neighborliness, social relations, sense of safety, and participation. Attachment should be prioritized to the identity of the social space where people can create arts, pride in the neighborhood due to good urban planning and management, belonging to the neighborhood, and representing the residents' lifestyle. Meanwhile, social relations should include leisure activities with neighbors, going to open spaces with neighbors, visiting each other's homes, going shopping together, attending cultural activities, and chatting when they meet. These are the key components to consider in urban social space planning to enhance social relations. A sense of safety should include safety at night, safety for vulnerable groups, safety for pedestrians, and safety in daylight. These are the key takeaways for consideration in social space design to respond to the sense of safety among urban dwellers. Further, participation should include participation in municipality decision-making, urban planning, and civic activities for strengthening good urban governance and redesigning urban social space through the lens of civil societies.

The findings could be useful for developing urban social spaces and prioritizing key factors to enhance sustainable urban development. Policymakers can select the key factors for designing urban social space from each aspect based on budgets and time. However, the limitation of the study is the sample size. Future study is needed to increase the sample size to understand the wider scope of Bangkok citizens, while a qualitative study should be conducted to explore how these factors are

important through the in-dept interview. These are necessary to understand the key measurement indicators of urban social space in detail to support spatial planning more clearly.

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