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Characteristic Factors Influencing the Thai-Style Public Space Utilization: Case Study of Sanam Na Mueang Public Park in Nakhon Si Thammarat Old Town, Thailand

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ABSTRACT

This research aims to identify the characteristic factors influencing the Thai-style public space utilization with the combination of variables of good public space characteristics following the occidental and Thai theories from the perspective of actual users in order to create new components or factors influencing the Thai-style public space utilization. Sanam Na Mueang Public Park, located in Nakhon Si Thammarat Old Town, was specified as the study area. Principal component analysis (PCA) was employed to classify 30 variables influencing the success of public space utilization; data was collected from questionnaire responses provided by 320 people. The results indicate that the new characteristic factors influencing Thai-style public space utilization consist of contextual connection and space identity, landscape elements, and aesthetics of public space utilization. These results reflect that both contextual connection and space identity, and landscape elements are consistent with occidental theories that prioritize physical characteristics and promote the access and facilitation, while the aesthetics of public space utilization, in contrast to occidental theories, prioritize the aesthetics of utilization and visibility to the surrounding people and activities.

Keywords: public space utilization, public space characteristics, Nakhon Si Thammarat old town, principal component analysis

INTRODUCTION

Public spaces are a major element of urban structure as they express the local social context, indicate the city's liveliness, and support various activities in order to create equality among people within the society (Musigakama, 2019) without limitations on social status, age, gender, educational level, or culture of the users. Safe public spaces with available areas for social activities, and sharing thoughts or cultures tend to become successful and attract more users (Şatir & Korkmaz, 2005). Furthermore, public spaces also promote the value and good image of the physical environment, resulting better livability and sustainability of the city (Asmawi et al., 2018)

Regarding the significance of public spaces, both occidental and Thai theorists and scholars have attempted to explain the defining factors of good-quality public spaces, including the factors influencing the success of public space utilization. Wirth (1938) explained the factor of activity diversity, saying that good public spaces furnish concentrated diversity of activities, people, societies and cultures, as well as representing the city liveliness (Wirth, 1938). Kongphunphin et al. (2018) said of good Thai-style public spaces that they must reflect the lifestyle of the local people, historical background, and values within the space, along with communicating the sociocultural identity, with a natural manner and flexible utilization (Rakpan & Oranratmanee, 2014). Public spaces that can attract people and economic activities can create opportunities for social activities and various other interactive opportunities or "virtual community", resulting in the co-presence of people with different objectives, and an active pedestrian environment (Hillier, 1989). Furthermore, good public spaces and active footpath networks promote microeconomics from the daily interactions of people, and maintain the liveliness of the surrounding roads (Jacobs, 1992). In addition, Paksukcharern (2008) explained that Thai people prefer gathering and conducting social activities on footpaths or small unoccupied spaces not specifically designed to be public spaces.

In addition, good public spaces promote urban safety and attract people; they also promote various activities at all times, and natural surveillance through the "eyes of the street". Good public spaces also encourage trust among those who use the spaces as well as sense of security (Jacobs, 1992). Creating a public space nurtured by natural movement with the balance of the eyes on the street is an essential factor in the elimination or mitigation of crime risk (Hillier & Sahbaz, 2008; Newman, 1972).

On the other hand, a public space and footpath network that fails to maintain diversity and movement can have a significantly adverse effect on the city due to the sense of insecurity stemming from spatial and social segregation (Jacobs, 1992), which is a symbol of environmental irregularity called "break windows", which tends to increase the level of criminal activities (Wilson & Kelling, 2017).

Therefore, good public spaces provide an essential influence on urban liveliness; they also encourage microeconomics from daily interactions of people, and create the sense of security and safety among the users. Office of the National Economic and Social Development Council (2016) issued a strategic plan to support appropriate and sustainable public space management for communities in order to promote and develop the human capital within the nation.

A number of scholars and researchers, especially from the occidental world, have done research on the significant characteristics that influence the attractiveness of public spaces. For example, Hillier and Hanson (1984) prioritized the form and configuration of space in order to identify the moving behavioral pattern and statistical behavior patterns of the public space users, while Gehl (1987) prioritized the physical characteristics that furnish various activities and attract people to the public space. Newman (1972) explained that good public spaces focus on safety through the concept of defensible space by prioritizing the design and environment in order to increase natural surveillance and promote the image, as well as the explicit territoriality in order to create a sense of community, and to control any strangers entering into the space. This is consistent with Whyte (1980), who explained that public spaces require explicit boundaries in order to create the sense of surrounding without seclusion, and the sense of security. However, Whyte's explicit territoriality is focused on controlling strangers entering into the

space, which is different from Jacobs (1992) who encouraged various interactions between strangers who mutually share experiences within the public space. Meanwhile, Thai scholars have also proposed the concept of good public space in the Thai context. For example, Atiphot (2002) suggested that good Thai-style public space characteristics are related to size and physical components within the spaces themselves, and are consistent with the Thai context and climate, while Oranratmanee (2014) and Paksukcharern (2008) explained that Thai-style public space characteristics comprise decent size and natural serenity.

The aforementioned concepts and principles show that perspectives of occidental scholars regarding quality and success of good public spaces differ from those of Thai scholars in terms of sociocultural context, local background, and physical elements related to the Thai context. The Thai perspective, however, only comprises top-down suggestions without empirical evidence to support, in particular, the suggestions of actual public space users.

The key objective of this research is to study the factors influencing the Thai-style public space utilization with the combination of variables of good public spaces in accordance with the occidental and Thai theories from the perspective of actual public space users of Sanam Na Mueang in Nakhon Si Thammarat Old Town. This study area is representative of the spatial elements and activities of the Thai-style public spaces.

The aim is to answer the research question – What factors influence Thai-style public space utilization? – and fill the gaps between occidental and Thai concepts, as well as identifying appropriate development guidelines for public spaces in the Thai context.

LITERATURE REVIEW TO IDENTIFY THE CHARACTERISTIC FACTORS INFLUENCING THE PUBLIC SPACE UTILIZATION

Occidental-style public space characteristics

Zucker (1959), in studying occidental-style public spaces, explained that in the city center, they reflect orderliness of activities and focus on utilization in the urban context. Yet some public spaces serve as civic spaces, and the overall characteristics are based on urban planning with grand and exquisite proportion. Gehl (1987) explained that the physical characteristics of public spaces affect the quality of physical environment, resulting in necessary, optional, and social activities that attract people to utilize the public spaces. Gehl and Birgitte (2013) concluded that the spatial characteristics influencing this attraction consist of 3 factors: suitable spatial proportion and surrounding context for human proportion, aesthetic recognition, and safe environment. In addition, Lennard and Lennard (1995) explained that physical characteristics also include landscape facilities, building colors, and identity of space (Lennard & Lennard, 1995).

The socioeconomic characteristics of public spaces are significant factors for good public spaces. Jacobs (1992) emphasized the significance of promoting the ability of public spaces to attract people to participate in various activities and at various times as the “ballet of the sidewalk”, presenting the social dynamics of the spaces and unofficial meaningful interactions, along with the liveliness of the space. In addition, public spaces nurtured by movement and interactions create natural surveillance through the eyes of people conducting activities within the spaces, or the “eyes on the street”, giving a sense of security to the public space users. Newman (1972) specified that safe public spaces depend on the design and physical environment, and explicit territoriality can control any strangers entering into the space. This is consistent with Whyte (1980), who explained that public spaces require explicit boundaries in order to create the

sense of surrounding without seclusion, and sense of security.

Hillier et al. (1993) explained that the design of functional public spaces does not mainly depend on the spatial characteristics of unoccupied spaces, but the configuration in relation to the global movement grid. Hillier and Hanson (1984) further explained that the global road grid has an influence on the natural movement level of local public spaces, which means that public spaces nurtured by natural movement of people can attract people and economic activities, create an urban buzz. This is consistent with Marcus and Francis (1998), who prioritized the location of local urban center with mixed land utilization. In addition, the explicit connection of public spaces to the movement grid and footpath network from surrounding communities accelerates the convenient utilization of public space (Lennard & Lennard, 1995; Sanoff & Dickerson, 1971).

Thai-style public space characteristics

Thai-style public spaces are public spaces in an Eastern context, which O' Connor (1983) said were not intentionally constructed. Tantimala (2017) explained that the Thai-style public spaces must be able to support activities in the local sociocultural context, as well as communicating the historical background and cultural landscape. This is consistent with Kongphunphin and Iamtrakul (2018), who explained that good public spaces must be able to support various activities, including recreation or social interaction, trade, religious expression, social or political value expression, learning, promotion of life quality, movement connection, and city image.

Atiphot (2002) indicated that the the success and popularity of the Thai-style public spaces are dependent on the space being of decent size. Oranratmanee (2014) further explained that the Thai agricultural-based society influences people to prefer public spaces with decent enough size that everyone can participate and gather. She also identified several other factors: flexible utilization without complete visibility; appropriate seating for gathering and hangout; sufficient shades from trees or eaves; and location near watersides and food sources. This is consistent with Paksukcharern (2008), who also identified that the major factor for popular public spaces in Thailand is decent size, while the minor factors are shade or shadow from surrounding buildings; shortcuts to other areas without movement through open ground; permanent or temporary commercial activities, and visibility from outside.

Nathiwutthikun (2008) indicated the characteristics of good public spaces include sufficient lighting, as well as guardhouses, checkpoints and service points in order to give a sense of security and aesthetics to the public space users.

The literature review on the characteristics of occidental- and Thai-style public spaces suggests that the Thai-style public spaces are not utilized in an orderly fashion, have been unintentionally constructed, have flexibility and adaptability, facilitate visibility, and attract unofficial sociocultural and economic activities, as well as focusing on small shady spaces with natural serenity due to local environment and climate. On the other hand, the occidental-style public spaces are based on standardized urban planning, including quality facilities, safety of public space users, and access and connection to a global movement grid, resulting in orderly activities.

Based on the aforementioned literature review, the common characteristics of occidental- and Thai-style public spaces were classified into 3 groups: internal characteristics, socioeconomic characteristics, and urban configuration characteristics, as presented in Table 1, leading to the determination of variables with the combination of the occidental- and Thai-style public space characteristics. Principal component analysis (PCA) was later employed to specify the factors that influence Thai-style public space utilization.

Table 1

List of Theories from Literary Review

Characteristics	Theorist	Topics
Internal Characteristics	Lennard and Lennard (1995)	Facilities Landscape Recreational Spaces
	Whyte (1980)	
	Gehl and Birgitte (2013)	
	Gehl (1987)	Quality Spaces
	Lennard and Lennard (1995)	Aesthetics
	Nathiwutthikun (2008)	
	Gehl and Birgitte (2013)	
	Nathiwutthikun (2008)	Lighting Safety
	Gehl and Birgitte (2013)	
	Jacobs (1961)	Natural Surveillance Defensible Space
	Newman (1972)	
	Lennard and Lennard (1995)	Space Indentity
	Whyte (1980)	
	Gehl and Birgitte (2013)	
	Atiphot (2002)	Characteristics of Thai Public Spaces: Small Spaces, Flexible Utilization, Seat, Shade, Location (near food and waterside)
	Paksukcharern (2008)	Shade Spaces with Shortcuts Commercial Activities Visible View
Socioeconomic Characteristics	Hillier (1996)	Movement Economy Natural Movement
	Hillier (1999)	Centrality as a Process Configurational Attractor
	Jacobs (1961)	Microeconomics
	Gehl (1987)	Social Activities
Urban Configuration Characteristics	Hillier et al. (1993)	Urban Grid
	Hillier and Hanson (1984)	Form and Configuration of Space
	Marcus and Francis (1998)	Location
	Sanoff and Dickerson (1971)	Movement System and Accessibility
	Lennard and Lennard (1995)	
	Paksukcharern (2008)	
	Gehl (1987)	Bonding Public Spaces

STUDY AREA

Nakhon Si Thammarat Old Town is an ancient settlement with historical value as a unique community in an urban center. Consequently, its physical characteristics consist of ancient monuments with space for social activities along its main thoroughfare, Ratchadamnoen Road. The Old Town consists of political, administrative, and business centers as well as residential zones (Figure 1). This is considered a unique area with some of the most pronounced cultural diversity in Nakhon Si Thammarat (Thinnakorn, 2021).

Sanam Na Mueang Public Park is a public space located on Ratchadamnoen Road, the main road of Nakhon Si Thammarat Old Town. With various facilities, the park serves as a transitional area as well as an area for daily activities, including exercise, recreation, leisure, rest, the buying and selling of street food, etc. Therefore, people come to conduct their daily activities at various times in this location. Furthermore, the park also serves as an area for traditional activities and ceremonies, such as almsgiving ceremonies on Buddhist holy days, government ceremonies, Songkran festivities, the Hae Pha Khuen That parade and traditional events, the Tenth Lunar Month festival, etc. The characteristics of Sanam Na Mueang Public Park are in accordance with good public space characteristics in both occidental and Thai theories, especially the Thai concepts proposed by Atiphot (2002) and Paksukcharern (2008): location near waterside, decent size, flexible utilization, shade, and good connection to the movement grid. As a result, this park provides an appropriate case study for this research (Figure 2).

Figure 1

Location and Current Condition of Sanam Na Mueang Public Park

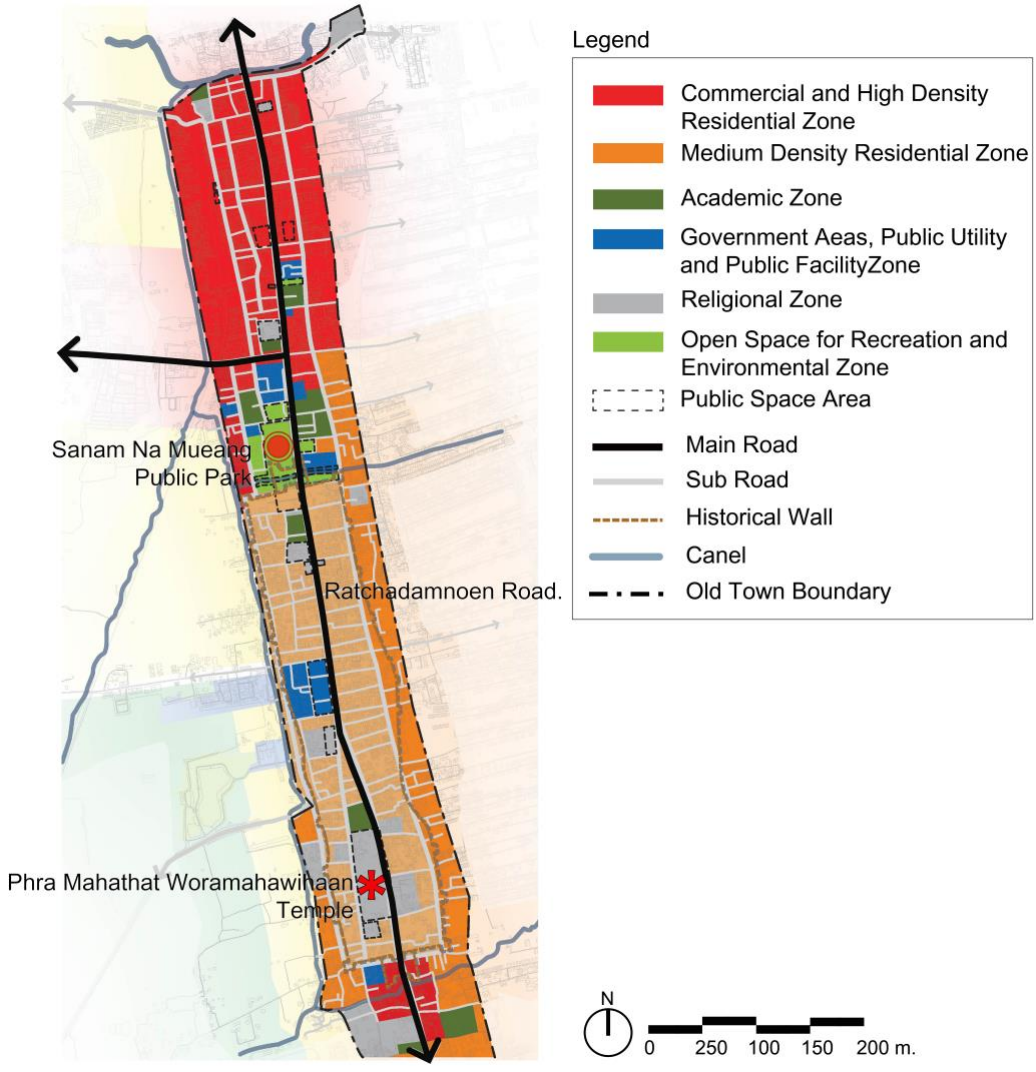

Figure 2

Location and Current Condition of Sanam Na Mueang Public Park

Note. This figure presents the contexts in the historical quarter connected to the main movement grid of the city. The activity area and utilization period follow occidental public space theories, while the physical elements within the space follow Thai-style public space theories.

METHODOLOGY

The multivariate statistical method or principal component analysis (PCA) was employed to analyze the factors influencing Thai-style public space utilization. Multivariate data was analyzed in order to find the correlations among these variables, resulting in a lower dimensional data set that consists of many variables while maintaining the maximum level of variation present in the data set. This was done by transforming to a new set of variables or principal components (PCs) which are uncorrelated, and which are ordered so that the first few retain most of the variation present in all of the original variables (Jolliffe, 2002).

For this research, the variables were the characteristics influencing the public space utilization gathered from the literature review of international and Thai theories, leading to the analysis to extract the common variables and identify the factors influencing the Thai-style utilization of public spaces from the perspective of actual users.

The literature review summarized in Table 1 led to the identification of 30 variables influencing public space utilization according to the occidental and Thai theories, as presented in Table 2.

Table 2

Variables Influencing the Public Space Utilization from Literature Review

Code	Variables Influencing Public Space Utilization	Related Research
V1	Waterside Spaces or Spaces with Water as Major Component	Atiphot (2002)
V2	Spaces with Benches, Edges or Stairs for Recreational Purposes	Whyte (1980); Atiphot (2002); Gehl and Birgitte (2013)
V3	Spaces for Festival and Entertaining Events	Whyte (1980)
V4	Decorative Plants for Atmospheric Enhancement	Lennard and Lennard (1995); Whyte (1980); Gehl and Birgitte (2013)
V5	Plants or Elements for Shade	Lennard and Lennard (1995); Atiphot (2002); Gehl and Birgitte (2013
V6	Facilities in Space	Whyte (1980)
V7	Public Utilities in Space	Whyte (1980)
V8	Multipurposed Table and Chair Sets	Whyte (1980)
V9	Sufficient Ambient Light	Nathiwutthiku (2008); Gehl and Birgitte (2013)
V10	Artificial Lighting for Atmospheric Enhancement	Nathiwutthiku (2008); Gehl and Birgitte (2013)
V11	Open Spaces	Jacob (1961); Lennard and Lennard (1995); Newman (1972); Atiphot (2002)
V12	Observation Points	Jacob (1961); Lennard and Lennard (1995); Newman (1972)
V13	Guardhouses, Checkpoints and Service Points	Lennard and Lennard (1995); Newman (1972); Nathiwutthikun (2008)
V14	Safety Poles	Whyte (1980); Lennard and Lennard (1995); Newman (1972)
V15	Statues and Fountains for Atmospheric Enhancement	Lennard and Lennard (1995)
V16	Path and Road Surface with Proper Level	Lennard and Lennard (1995)
V17	Outstanding Furnishings and Colors	Lennard and Lennard (1995)
V18	Mnemonic Borders and Shapes	Lennard and Lennard (1995)
V19	Proper Size for Users/Audience/Participants	Lennard and Lennard (1995); Gehl and Birgitte (2013)
V20	Unique Low-rise Surrounding Buildings	Gehl and Birgitte (2013)
V21	Spaces with Original Environmental Identity	Whyte (1980); Atiphot (2002); Gehl and Birgitte (2013)
V22	Multipurposed Spaces	Jacob (1961); Whyte (1980); Hillier et al. (1993); Hillier (1996); Hillier (1999)
V23	Surrounded and Safe Spaces	Whyte (1980); Newman (1972); Lennard and Lennard (1995)
V24	Spaces Connecting to Surrounding Residential or Public Buildings	Hillier et al. (1993); Hillier (1996); Hillier (1999); Gehl and Birgitte (2013)

Table 2 (Continued)

Code	Variables Influencing Public Space Utilization	Related Research
V25	Spaces at the Center of Lively Community	Jacob (1961); Hillier et al. (1993); Hillier (1996); Marcus and Francis (1998); Hillier (1999)
V26	Spaces Connecting to Main Roads and Community Roads with Distinct Accessibility	Sanoff and Dickerson (1971); Hillier et al. (1993); Hillier (1996); Hillier (1999)
V27	Spaces Surrounded by Footpath Network	Lennard and Lennard (1995); Hillier et al. (1993); Hillier (1996); Hillier (1999); Paksukcharern (2008)
V28	Spaces Surrounded with Commercial Activities and Social Activities	Jacobs (1961); Hillier and Hanson (1984); Hillier et al. (1993); Hillier (1996); Hillier (1999); Puksukcharern (2008)
V29	Spaces with Shortcuts to other Places	Hillier et al. (1993); Hillier (1996); Hillier (1999); Puksukcharern (2008)
V30	Spaces Surrounded with Roads and Footpaths	Sanoff and Dickerson (1971); Lennard and Lennard (1995)

Questionnaire and sampling

The questionnaire design and sampling followed the steps below*:*

- Variable identification – The variables gathered from the literature review were used to develop the questionnaire, which consisted of 30 items consistent with the 30 identified variables*/*characteristics influencing public space utilization*.* The respondents rated each item in interval scale, with the rating from 1 to 5*:* 5 was assigned to the highest influencing factor; 4 for a high influencing factor; 3 for a moderate influencing factor; 2 for a low influencing factor; and 1 for the lowest influencing factor*.*

- Sample size – Comrey and Lee (1992) mentioned that the number of samples should exceed the number of variables by approximately 5-10 times and should not be less than 300 samples*.* In this research there were 320 samples or approximately 10 times of the number of variables, consistent with the criteria of principal component analysis *(*PCA*).*

- Survey periods and days – Because of the application of accidental sampling, responses were collected from actual public space users during 5 periods of each day in order to follow the behavior of the respondents and various activities in each period. The times of the 5 periods were 6.00-9.00 hrs., 9.00-12.00 hrs., 12.00-15.00 hrs., 15.00-18.00 hrs., and 18.00-21.00 hrs*.* Furthremore, the questionnaires were distributed on both weekdays and weekends for a period of one month in order to capture responses from participants in different activities and different groups of people in the public space*.*

- Questionnaire validity – Content validation was employed to cover the theoretical variables gathered from the literature review*.* Furthermore, face validity was also employed by requesting verification of all variables by an expert in order to ensure the theoretical validity and consistency with the respondents*'* behaviors in the study area of Sanam Na Mueang Public Park*.*

- Questionnaire reliability – The questionnaire reliability was verified by calculating the Cronbach*'*s Alpha and conducting corrected item-total correlation tests*.* It was found that the Cronbach*'*s Alpha was equal to 0.966, or above 0.70 (Hair et al., 2006), while the result of the corrected item-total correlation test indicated the value of every question was above 0.30

(Field, 2009) on the corrected item-total correlation test, suggesting high reliability of the questionnaire.

The questionnaire was explained to the distributors in order to ensure mutual understanding between the distributors and researchers, so that the former would be able to respond to any inquiries raised by the respondents. A pre-test of 30 questionnaires was also conducted in order to verify the questionnaire and estimate the proper period required for questionnaire distribution.

A reliability analysis was employed on the data set collected by the questionnaire by conducting KMO and Bartlett's test with SPSS statistics software in order to verify the reliability for the principal component analysis (PCA). The correlation matrix was applied to measure the data probability (Tabachnick & Fidell, 2001). The results are presented in Table 3.

According to the results, data suitability analysis was conducted with the following statistics taken into account:

- KMO (Kaiser-Meyer-Olkin): Data analysis shows the KMO value at 0.965, which, as it is above 0.80, means that this set of variables is most appropriate for component analysis. Additionally, its Sig. at .000 shows its statistical significance; the variables are correlated and can be used for component analysis.

- Bartlett's Test of Sphericity: These values are used to test whether there is correlation among variables. The correlation values can be found in the Table of Correlation Matrix. The hypotheses are as follows:

H_0 = no correlation among variables, and H_1 = correlation among variables. The data analysis showed a test statistic with an estimated distribution of $x^2 = 6832.080$. The Sig. at 0.000 showed its statistical significance, suggesting that the variables are correlated and appropriate for component analysis.

- Variance of Each Variable: The consideration of the MSA values from anti-image correlations, or the communality (h^2) values shown diagonally in the table, revealed that all variables were above 0.5, which means the indicated variables are appropriate for component analysis.

Principal component analysis (PCA)

PCA was employed to the multivariable analysis with the following process:

- Factor Extraction – The principal component analysis of PCA was employed to reduce the dimensionality by finding a smaller set of variables along which the covariation in the data is maximal. Factor loading was indicated for classification of any indicators or variables. The communality table presenting the extraction value indicated that the extraction value of all variables was over 0.5, which means that all variables could be classified.

- Factor Rotation – Varimax rotation was employed to maximize high- and low-value factor loadings and minimize mid-value factor loadings, resulting in a small number of important variables for easier interpretation.

- Component Interpretation – With the factor scores indicated, the analyzed variables led to the interpretation of the components or factors influencing the public space utilization.

Table 3

KMO and Bartlett's Test

Kaiser-Mayer-Olkin Measure of Sampling Adequacy		.965
Barlett's Test of Sphericity	Approx. Chi-Square	6832.080
	Df	435
	Sig.	.000

RESULT

Descriptive statistics

General information of the respondents

- Gender: 44% are male and 56% are female
- Occupation: 45.9% are students, 14.7% are vendors/self-employed, and 12.8% are employees.
- Domicile: 53% of the respondents live inside Nakhon Si Thammarat Municipality, 35% reside outside of Nakhon Si Thammarat Municipality, and 12% are from other provinces.
- Utilization period: 45% of respondents utilized the public space during 15.00-18.00 hrs., 39% during 18.00-21.00 hrs., 15% during 10.00-12.00 hrs., and 10% during 6.00-9.00 hrs.
- Activity: 58.1% for relaxing and strolling, 42.5% for exercise and sports, 33.8% for admiring the environment, 38.4% for casual meetings or hanging out, 24.1% for transitional area to work or errand, 25.9% for buying goods, 22.5% for waiting area, and 15% for rest area after finishing activities nearby.

The above results indicate that the public space users are of both genders, mainly live inside Nakhon Si Thammarat Municipality and utilize the public space at various time throughout the day. The popular activities are optional, social and necessary activities.

Descriptive statistics of the characteristic factors influencing the public space utilization

According to the descriptive statistics table (Table 4) presenting the mean of each variable influencing the public space utilization from the data collected from 320 respondents, the 5 variables with the highest mean in order are Open Spaces (V11), Spaces at the Center of Lively Community (V25), Spaces Connecting to Main Roads and Community Roads with Distinct Accessibility (V26), Spaces Surrounded by Footpath Network (V27), and Spaces for Festival and Entertaining Events (V3), suggesting that people highly prioritize the open space, which can serve as community center and recreational activity area during the festivals or occasions, with access and connection to the main road and footpath network surrounding the public space.

On the other hand, according to the same table, the 5 variables with the lowest mean in order are Waterside Spaces or Spaces with Water as Major Component (V1), Safety Poles (V14), Public Utilities in Space (V7), Multipurposed Table and Chair Sets (V8), Facilities in Space (V6), Observation Points (V12) and Statues and Fountains for Atmospheric Enhancement (V15), suggesting that people do not strongly prioritize the waterside location, small facilities and decorations, such as bollards, chairs, statues, fountains, etc

Table 4

Descriptive statistics of Variables Influencing Public Space Utilization

Code	Variables Influencing Public Space Utilization	N	Mean	Std. Deviation
V1	Waterside Spaces or Spaces with Water as Major Component	320	3.22	1.102
V2	Spaces with Benches, Edges or Stairs for Recreational Purposes	320	3.51	1.044
V3	Spaces for Festival and Entertaining Events	320	3.70	1.066
V4	Decorative Plants for Atmospheric Enhancement	320	3.64	1.044
V5	Plants or Elements for Shade	320	3.55	1.028
V6	Facilities in Space	320	3.36	1.091
V7	Public Utilities in Space	320	3.29	1.065

Table 4 (Continued)

Code	Variables Influencing Public Space Utilization	N	Mean	Std. Deviation
V8	Multipurposed Table and Chair Sets	320	3.35	1.081
V9	Sufficient Ambient Light	320	3.69	1.054
V10	Artificial Lighting for Atmospheric Enhancement	320	3.53	1.020
V11	Open Spaces	320	3.81	.996
V12	Observation Points	320	3.36	1.034
V13	Guardhouses, Checkpoints and Service Points	320	3.41	1.016
V14	Safety Poles	320	3.27	1.126
V15	Statues and Fountains for Atmospheric Enhancement	320	3.36	1.108
V16	Path and Road Surface with Proper Level	320	3.52	1.077
V17	Outstanding Furnishings and Colors	320	3.37	1.016
V18	Mnemonic Borders and Shapes	320	3.56	1.075
V19	Proper Size for Users/Audience/Participants	320	3.61	1.030
V20	Unique Low-rise Surrounding Buildings	320	3.48	1.074
V21	Spaces with Original Environmental Identity	320	3.53	1.056
V22	Multipurposed Spaces	320	3.68	1.111
V23	Surrounded and Safe Spaces	320	3.63	.996
V24	Spaces Connecting to Surrounding Residential or Public Buildings	320	3.52	1.056
V25	Spaces at the Center of Lively Community	320	3.76	1.067
V26	Spaces Connecting to Main Roads and Community Roads with Distinct Accessibility	320	3.71	1.032
V27	Spaces Surrounded by Footpath Network	320	3.70	1.071
V28	Spaces Surrounded with Commercial Activities and Social Activities	320	3.57	.980
V29	Spaces with Shortcuts to other Places	320	3.55	1.073
V30	Spaces Surrounded with Roads and Footpaths	320	3.64	1.065
Valid N (listwise)		320		

Principal component analysis (PCA)

Principal component analysis *(*PCA*)* was employed to the data collected from 320 questionnaires on the characteristics influencing public space utilization responded to by 320 people. The statistical results are as shown in table 5.

The Component column presents the number of extracted components equal to that of the variables to be extracted. In this study, 30 variables on *"*Variables Influencing Public Space Utilization*"* were analyzed.

The Initial Eigenvalue column presents the eigenvalue of 30 extracted variables, three of which had an eigenvalue greater than 1.

The Extraction Sums of Squared Loadings column presents the total eigenvalue, percentage of variance, and cumulative percentage of each component with an eigenvalue greater than 1 after the varimax rotation. The values after rotation, presented below.

The eigenvalue of the 1st component was 7.164, equal to the percentage of variance at 23.880.

The eigenvalue of the 2nd component was 6.443, equal to the percentage of variance at 21.478.

The eigenvalue of the 3rd component was 5.030, equal to the percentage of variance at 16.767.

After the rotation, however, the accumulated variance of all three extracted factors was equal to 62.124.

The rotated component matrix table presents the weight of the components as the value of the correlation between all variables and 3 classified components after the rotation, which made the weight of each component or variable more distinct.

The component classification considered the variables from the same row as each component: 3 rows and 3 components in this case. The components had weights near 1 or -1, or with the value from 0.5 to 1 and -0.5 to 1. Therefore, the components in the same row with the weight in such range were classified into the same group. According to the rotated component matrix, the factors were classified as follows:

1st component consisted of 13 variables: V27, V26, V30, V25, V19, V23, V17, V24, V29, V20, V22, V28 and V21, all of which indicated the percentage of variance at 23.880.

2nd component consisted of 9 variables: V14, V17, V6, V15, V7, V8, V13, V16 and V12, all of which indicated the percentage of variance at 21.478.

3rd component consisted of 8 variables: V9, V5, V1, V4, V3, V2, V10 and V11, all of which indicated the percentage of variance at 16.767.

Table 5

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loading			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.242	50.806	50.806	15.242	50.806	50.806	7.164	23.880	23.880
2	2.037	6.792	57.598	2.037	6.792	57.598	6.443	21.478	45.358
3	1.358	4.527	62.124	1.358	4.527	62.124	5.030	16.767	62.124

Table 6

Classification of Factors after Extraction and Rotation

Components of Factors	Code	Variables	Factor Loading	% of Variance
1st Component: Contextual Connection and Space Identity	V27	Spaces Surrounded by Footpath Network	.774	
	V26	Spaces Connecting to Main Roads and Community Roads with Distinct Accessibility	.772	
	V30	Spaces Surrounded with Roads and Footpaths	.715	
	V25	Spaces at the Center of Lively Community	.699	
	V19	Proper Size for Users/Audience/Participants	.651	

Table 6 (Continued)

Components of Factors	Code	Variables	Factor Loading	% of Variance
1st Component: Contextual Connection and Space Identity	V23	Surrounded and Safe Spaces	.645	23.880
	V18	Mnemonic Borders and Shapes	.640	
	V24	Spaces Connecting to Surrounding Residential or Public Buildings	.635	
	V29	Spaces with Shortcuts to other Places	.631	
	V20	Unique Low-rise Surrounding Buildings	.616	
	V22	Multipurposed Spaces	.611	
	V28	Spaces Surrounded with Commercial Activities and Social Activities	.605	
	V21	Spaces with Original Environmental Identity	.594	
2nd Component: Landscape Elements	V14	Safety Poles	.744	21.478
	V17	Outstanding Furnishings and Colors	.730	
	V6	Facilities in Space	.712	
	V15	Statues and Fountains for Atmospheric Enhancement	.705	
	V7	Public Utilities in Space	.700	
	V8	Multipurposed Table and Chair Sets	.657	
	V13	Guardhouses, Checkpoints and Service Points	.634	
	V16	Path and Road Surface with Proper Level	.631	
	V12	Observation Points	.623	
3rd Component: Aesthetics of Public Space Utilization	V9	Sufficient Ambient Light	.722	16.767
	V5	Plants or Elements for Shade	.640	
	V1	Waterside Spaces or Spaces with Water as Major Component	.634	
	V4	Decorative Plants for Atmospheric Enhancement	.618	
	V3	Spaces for Festival and Entertaining Events	.604	
	V2	Spaces with Benches, Edges or Stairs for Recreational Purposes	.542	
	V10	Artificial Lighting for Atmospheric Enhancement	.513	
	V11	Open Spaces	.497	

- Interpretation - The principal component analysis *(*PCA*)* results led to the classification of the correlated variables to create the factors influencing the public space utilization, which were interpreted and ordered as follows*:*

1st Component: Contextual Connection and Space Identity – The connection of public spaces to roads and footpaths for easy access; appropriate size for utilization, promoting various activities and liveliness at all times; and distinct borders surrounded by trees and mnemonic buildings.

2nd Component: Landscape Elements – The infrastructure and facilities, providing the convenience and safety for the public space users; and environmental enhancement.

3rd Component: Aesthetics of Public Space Utilization – Good atmosphere consistent with the climate, shade from trees and landscape elements and cool breeze from water sources, promoting the comfort of public space users, and facilitating the gathering for activities, either routine or seasonal; visibility on surrounding activities; and safe feeling with sufficient ambient light at all times.

DISCUSSION

The results present empirical evidence from the perspective of the actual public space users on the factors influencing the Thai-style utilization of public spaces, showing that there are 3 key factors*:* contextual connection and space identity, landscape elements, and aesthetics of public space utilization, in order from the most to the least influencing*.*

1st Component: Contextual Connection and Space Identity – This component consists of a group of variables related to connection and identity. The connection-related variables – especially V27, V26 and V30, which had the highest factor loading values – illustrate the significance of a footpath network in the context of providing access to the public space and connecting it to the surrounding areas. The identity-related variables present the significance of liveliness and diversity of activities, along with the explicit boundary that create the sense of security in terms of space and quantity of users suitable for the public space utilization.

2nd Component: Landscape Elements – This component is a group of variables related to infrastructure and facilities. The most significant variable is the safety of pedestrians, comprising ground control and explicit boundaries between pedestrians and vehicles, as presented in V14, with the highest factor loading value in this category. The safety measures also include such things as guardhouses, checkpoints, service points and other major internal elements of the public space. Facilities for public space users, such as adjustable seats, beautiful furnishings, landmarks, etc. improve the overall image.

3rd Component: Aesthetics of Public Space Utilization – This component comprises a group of variables related to the convenience of public space users consistent with local climate. Sufficient lighting and shade are required, along with proper ventilation for a waterside zone that can be used for recreation and relaxation, as presented in V9, V5 and V1, with the highest factor loading values in this category. In addition, the public space must be able to facilitate traditional and occasional activities in order to provide a venue for the gatherings at different periods of time.

All 3 factors are consistent with the first 2 occidental theories. For the contextual connection and space identity, the location of the unoccupied public spaces connects to the movement system for easy access, surrounded by communities, buildings and agricultural spaces, attracting more people to utilize the public space. This is consistent with what Jacobs (1992) and Hillier and Hanson (1984) mentioned; that is, that socioeconomic activities promote urban liveliness and density within the unoccupied public spaces. Therefore, this is the most influential factor.

For the landscape elements, distinctive and well-decorated activity areas promote convenience, safety and a desire to utilize the spaces, consistent with what Lennard and Lennard (1995) and Whyte (1980) said about facilities, landscape condition and recreational activities within the spaces comprising the factors leading to successful utilization.

However, the aesthetics of public space utilization that reflect the differences between

occidental- and Thai-style public space characteristics can be divided into 2 issues.

The first issue is the aesthetics of public space utilization, which is subject to the physical context of Thailand, which its tropical climant. For this reason, public spaces must be ventilated and shaded by perennial plants, buildings or other instruments, such as gazebos, parasols, canvases, etc. The location must be near a water source to invite a cool breeze to enhance the aesthetics. This is consistent with what Atiphot (2002) said regarding the small and shady waterside space, as well as what Paksukcharern (2008) and Oranratmanee (2014) suggested about Thai-style unoccupied public spaces, again, saying that they should be small and shady, with natural serenity.

The other issue is the visibility of surrounding activities as Thai-style public spaces are expected to be multipurpose, used for different activities, both routine (such as exercise, buying and selling street food, or eating in groups) and seasonal, attracting many people to participate. Therefore, clarity and sufficient ambient light in the daytime, and safety during the night, are essential and consistent with Nathiwutthikun (2008), who stated that sufficient light creates feelings of safety. This aesthetic factor also accommodates the activities and interactions among people, as well as promoting visibility to the surrounding activities, consistent with Atiphot (2002) and Paksukcharern (2008), who found that small spaces with good visibility lead to feelings of safety.

CONCLUSION

The results of the study of the characteristic factors influencing Thai-style public space utilization indicate the importance of 3 factors*:* the contextual connection and space identity, the landscape elements, and the aesthetics of public space utilization, in decending order from the most influential factor resulting from principal component analysis. This is based on empirical evidence from the bottom-up perspective of the public space users in the Thai context, resulting in identification of new factors from the classification of the variables gathered from the concepts on the public space characteristics with the combination of variables of good public space characteristics following the occidental and Thai theories under the perspective of actual public space users. Previouosly, the characteristics influencing the Thai-style public spaces have been merely top-down suggestions from the perspective of some Thai scholars, lacking the support of empirical evidence.

Therefore, the aforementioned results now fill the gap between occidental and Thai theories. The first 2 factors, the contextual connection and space identity, and the landscape elements, are consistent with the occidental theories, prioritizing the physical characteristics which promote access and facilitation to the public space users. On the other hand, the last factor -- the aesthetics of public space utilization -- in contrast to the occidental theories, prioritizes the aesthetics of utilization, waterside location, climate consistency, and visibility to the surrounding people and activities, both routine and seasonal, which attract unofficial activities and interactions among public space users, and create a sense of safety, with full visibility to the surrounding people and activities.

The results can be applied to global public space development plans and policies, as well as the prioritization of public space development consistent with the characteristic factors influencing the Thai-style public space utilization*.:*

The most influential factor on Thai-style public space utilization is the contextual connection and space identity. In order to achieve this factor, a footpath network that connects the movement grid within the public space to the main road is required to facilitate the movement of people around and through the public space and to the surrounding areas. Therefore, a high-quality movement grid, nurtured by natural movement within the public space leads to the maintenance of liveliness on the street from various activities, whether daily, traditional or occasional. Furthermore, the microeconomics from the interactions can create a space identity consistent with the local social, cultural, and economic contexts.

The second-most influential factor on Thai-style public space utilization comprises the landscape elements, which are related to the infrastructure and facilities within the public space. The most significant are the safety facilities, including the

explicit boundaries between pedestrians and vehicles; formal surveillance, such as guardhouses, checkpoints and service points; and informal surveillance or natural surveillance by the actual public space users. Also significant are the convenience facilities, including adjustable seats for different activities, such as relaxation, resting after exercise, waiting area, etc. Furthermore, facilities that can improve the image of the public space, including landmarks and good overall maintenance are also significant.

The final influencing factor on the Thai-style public space utilization comprises the aesthetics of public space utilization, with an emphasis on the significance of location, natural environment, and climate in order to provide convenience to public space users. Examples include sufficient lighting, shade from trees and eaves, good natural ventilation, water sources, etc. In addition, the public space should be consistent with the local sociocultural context and be able to support various cultural activities. Some of these daily and occasional activities are organized in the same space with flexible time, such as street vending, picnicking, small group get-togethers, morning almsgiving, etc.

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