The Life of Khon Kaen – Cognition or Morphology? Lessons from a Regional City of Thailand

ชีวิตเมืองขอนแก่น: การเรียนรู้สภาพแวดล้อมหรือสัณฐานวิทยา? บทเรียนจากเมืองหลักของภาคในประเทศไทย

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บทคัดย่อ

บทความนี้มีวัตถุประสงค์ที่จะชี้ให้เห็นว่าอะไรเป็นปัจจัยสำคัญของการมีพื้นที่สาธารณะในเมือง ที่มีชีวิตชีวา และหลากหลาย ในบริบทของสังคมไทยระหว่างการมีพื้นที่ที่มีลักษณะน่าจดจำ (Spatial Cognition) กับลักษณะการวางตัวหรือการเชื่อมโยงกันของพื้นที่เอง (Spatial Morphology) โดยใช้เมืองหลักของภาคตะวันออกเฉียงเหนือ ได้แก่เมืองขอนแก่นเป็นกรณีศึกษา เนื้อหา เริ่มต้นจากการกล่าวถึง ประวัติศาสตร์การพัฒนาเมืองโดยย่อ เพื่อเป็นข้อมูลพื้นฐานในการทำความเข้าใจเมือง และบทบาทของเมืองในปัจจุบันจากนั้นจึงกล่าวถึงองค์ประกอบที่น่าจดจำของเมืองตามแนวทางของ Lynch (1960) และสัณฐานของเมือง (Urban Morphology) หรือความสะดวกในการเข้าถึงพื้นที่ สาธารณะในเมืองโดยทฤษฎี Space Syntax (Hanson & Hillier, 1987) ตลอดจนการใช้พื้นที่สาธารณะ ในเมืองขอนแก่น การศึกษาพบว่าลักษณะทางกายภาพหรือความน่าจดจำขององค์ประกอบในเมือง ไม่ได้มีส่วนต่อการใช้พื้นที่สาธารณะในเมือง แต่เป็นในทางกลับกัน กล่าวคือพื้นที่ที่ยิ่งมีการใช้งานมาก ผู้คนยิ่ง จดจำพื้นที่นั้นได้มาก แม้ว่าลักษณะทางกายภาพจะดีหรือไม่ก็ตาม นอกจากนี้ยังพบว่า ความสะดวกในการ เข้าถึงพื้นที่ หรือสัณฐานของเมือง นับเป็น ปัจจัยสำคัญ สำหรับ การใช้พื้นที่ สาธารณะในเมือง ทั้งที่เป็นถนน ทางเดินเท้า หรือที่เป็นจุดศูนย์รวม และสถานที่ต่างๆ อย่างไรก็ตามยังมี ข้อยกเว้นสำหรับสถานที่บางแห่ง ที่แม้จะมีความสะดวกในการเข้าถึงสูง แต่กลับมีการใช้งานน้อย ทั้งนี้เนื่องจากเป็นพื้นที่ที่ไม่ได้ใช้งานในชีวิตประจำวัน แต่เป็นพื้นที่ศักดิ์สิทธิ ได้แก่ บริเวณศาลหลักเมือง หรือเป็นพื้นที่ที่ลับตาคน (Low Visibility) เป็นปัญหาด้านความปลอดภัย ผู้คนจึงไปใช้งานน้อย ได้แก่ บริเวณสวนรัชดา จากนั้นเป็นบทสรุปและ ข้อเสนอแนะ สำหรับแนวทาง การปรับปรุงพื้นที่สาธารณะ ในเมืองขอนแก่น เพื่อความมีชีวิตชีวาของพื้นที่ สาธารณะในเมือง

คำสำคัญ: พื้นที่สาธารณะในเมือง การจดจำ สัณฐานของเมือง เมืองหลักของภาค

Abstract

The aim of this article is to ascertain the key factors, cognition or morphology of public spaces in making lively and diverse urban public spaces in the Thai context. It investigates spatial cognition as well as spatial configuration and the uses of public spaces of Khon Kaen, a regional city in Northeastern Thailand.

The article starts with a brief history of Khon Kaen which led to its present roles in order to understand the city's background. It then examines the city's spatial cognitions, spatial configurations and the life of public spaces. The findings are as follows. Spatial configuration is a vital basic factor in making lively and diverse streets as well as nodes and places. Strong image elements are also associated with heavily used spaces although those elements do not have strong identity. However, there are some minor exceptions where nodes and places with very few users are along highly integrated routes. The reasons are varied; they are not in the daily uses of the people, but only sacred ones; they accommodate only *necessary activities* (Gehl, 1987); or they have security problems because of very few alternative routes and low visibility. Finally, the article provides suggestions and recommendations for the life of the city and for urban public spaces in general.

Keywords: urban public space, cognition, spatial structure, regional city

1. Introduction

Space is on the one hand constructed by society, and on the other shapes the society (Hillier, 1996). Urban public space is one of the key issues for those who interested in promoting public life in the city, as the life of urban public spaces is central to the life of the city. The manifestation of public urban spaces is the wholeness reflection of political, economic and cultural factors of that society. In the widest sense, urban space is an agglomeration of people, objects and events (Madanipour, 1996). Space is neither a neutral void, it is in fact defined by relations between activities, processes and

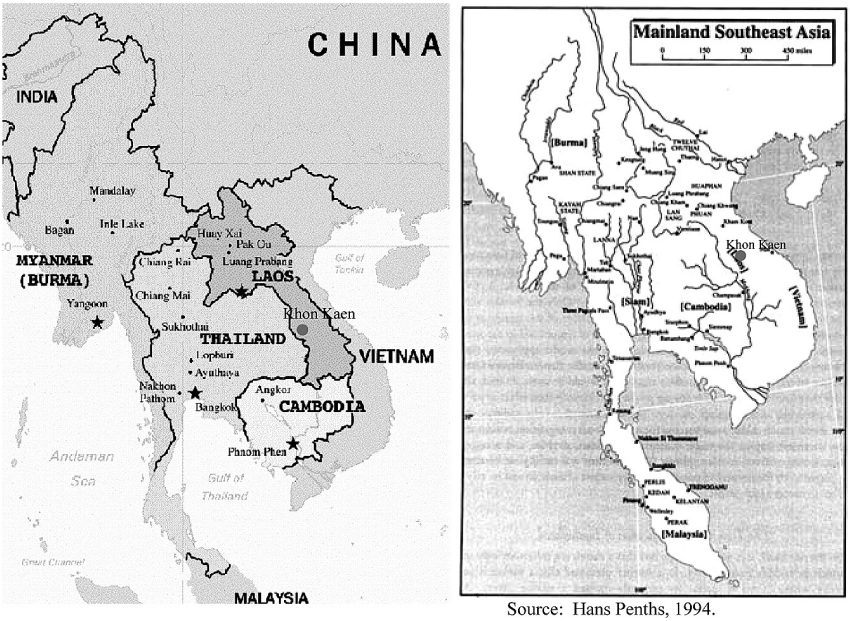
elements in the environments (Askew, 2002: 6). Space then becomes a meaningful 'place' through various practices. Well-populated and diverse-used urban public spaces seem to offer more opportunity for its people face-to-face interaction that is one of the fundamental parts in the social process.

The aim of this paper is to figure out what are the key factors, cognition or morphology of public spaces, in making lively and diversely urban public spaces in the Thai context. It investigates spatial cognition, spatial configuration and the uses of public spaces of a regional city in the North-eastern Thailand, Khon Kaen.

The study is divided into two parts. The first part deals with the spatial cognition analysis of Khon Kaen City. The results reveal the ineffectiveness of the physical characteristics on the cognitive image of the city. Moreover the cognitive image of the city does not influence the uses of spaces within the city but vice versa. The second part is Khon Kaen's spatial configuration analysis, using space syntax methodology. The results show that most nodes and places as well as paths that are heavily used are well integrated.

2. Khon Kaen in Brief

Khon Kaen was a small town, scarcely appeared in the historical map, gaining its momentum only during 1960s and 1980s. This part will look at the city history and its present roles.



Source: Hans Penths, 1994.

Figure 1 *Khon Kaen Locations in the Present and Old Maps without Country Boundaries.*

Even though there were many prehistoric and historic settlements in the area where Khon Kaen city is now (Buasri, 1995 & Kwanyuen et al. et al, 1995), not until 1789 that the formal history of Khon Kaen started when King Rama I appointed the 'chief' of a new settlement at Beung-bon southward from the present Khon Kaen. In 1797 Beung-bon village was promote to 'Muang Khon Kaen' or Khon Kaen Town. Throughout the early Rattannakosin Reign the town was moved to many locations in the vicinity due to serious diseases and food shortages. Finally in 1899, it moved to Muang Kow near a big lake, the present Bueng Kaen Nakhon. During the reformation of provincial administration, many public facilities and utilities were built in Khon Kaen including a small airport to the north of the town in 1904. (Harnpachern, 2000).

The modern history of Khon Kaen started in 1964 when Sarit Thanarat, the prime minister, chose Khon Kaen for the location of first state university outside Bangkok in the northeast. In 1982 Khon Kaen has been designated as the centre of the region during the fifth National Economic and Social Plan. Khon Kaen is also at a strategic location, the junction of the major north-south route connecting Bangkok and Nongkhai to Loas PDR and the east-west economic corridor between Myanmar and Viet Nam.

Khon Kaen is one of the centres by the 'top down policy' and its strategic location. Today Khon Kaen is known as the 'gate way to Isan (the northeast)', and an institutional town being centre for administration, education and health care. The total area of the Municipality is 46 square kilometres with a number of population 119,858 in 2008 (Ministry of Interior, 2008). It is rated as the sixth largest municipalities outside Bangkok Metropolitan Vicinity, after Hadyai, Chiang Mai, Udonthani, Nakhonratchasrima, and Suratthani.

Khon Kaen University is a major magnet of the city. With the number of approximately 30,000 staffs and students, it creates another centre to the northwest of the city. The major centre concentrates to the north of the old town, adjacent to the 'Beung Kaen Nakhon' - a big lake, where new facilities were built during the reform of provincial administration. (Figure 2, 3 and 4 show the present Khon Kaen aerial photo, Khon Kaen built-up area development and the city structure). To the north of the city centre is another magnet, the governmental office zone, brings a number of people to the area

In conclusion, Khon Kaen is a small regional center in terms of education, financial institutions, government offices and transportation. Khon Kaen University is one of the major magnets of the city, dominating the city structures and affecting land-use patterns of the surrounding.

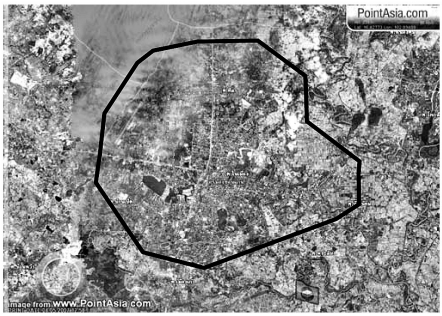


Figure 2 *Khon Kaen Ariel Photo 2007*

..... *municipality area* ▬▬ *Khon Kaen by-pass routes*

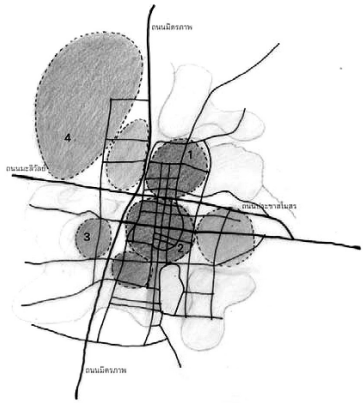


Figure 4 *Khon Kaen City Structure*

Governmental Centre
City Centre
Educational Institution Zones
Medium Density Residential Area
Low Density Residential Area

4 Khon Kaen University

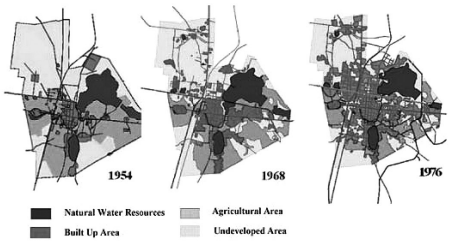


Figure 3 *Khon Kaen's Built-up Areas 1954-76*
Source: *(Harnpachern, 2000).*

3. Spatial Cognition Analysis

Spatial cognition analysis aims to explore which spatial elements in the city have an effect on the "legibility" of the city and how these elements related to the uses of public space. Kevin Lynch (1960) suggested that the legibility of the city, by physical distinctiveness and interconnection between elements, is the key to spatial cognition or the image of the city. This spatial cognition can help people in way findings when travelling around the city. Moreover, the natural movements of people in Hamstead Garden Suburb in

London are also congruent with the image maps of the community. Within these ideas, the study will examine the spatial cognition of Khon Kaen City.

3.1 Method

Thirty-five respondents are randomly selected to represent residents of two districts, the city centre and the university area, 14 from KKU campus and 21 from the city area. Another 10 staffs from the Faculty of Architecture represent a group of the expert in city design and planning. The average age of respondents are 32 years old and more than 30% reside in Khon Kaen for more than 20 years. Respondents are interviewed and asked to draw a sketch map of Khon Kaen City. Reference places and paths used in each sketch map are recorded according to their types.

3.2 Results

There are 131 most recognizable entities used as references in sketch maps. Among these 131 entities, 101 are characterized as “points” or “places”, and 30 are “lines” or “paths”. Frequency of appearance for each element is recorded. Only elements with frequency percentage greater than 20 are considered in this study. The findings show that there are 20 elements categorized as places. Thirteen out of twenty point-like elements are nodes, five are landmarks, and only two are districts. For line-like elements, only two out of thirteen are edges (i.e., railroad track and Kaen Nakhon Lake Drive). Though more point-like elements are used by respondents in sketch maps, their frequency percentage is lower than that of the line-like elements. This number of frequency percentage may imply the distinctiveness of each element.

Table 1: Top 10 city elements used in sketch maps

Rank	Reference points/ lines	Frequency (Percentage)	Type
	Places		
1	Fairy Department Store	57.8	Node
2	Kaen Nakhon Lake	55.6	Landmark
3	Bus Terminal 1	53.3	Node
4	City Gateway	37.8	Landmark
4	Big C Supermarket	37.8	Node
4	Bus Terminal 2	37.8	Node
5	Khon Kaen University	35.6	District
6	Sofitel Hotel	28.9	Landmark
7	City Pillar Shrine	26.7	Landmark
7	Khon Kaen Wittayayon School	26.7	Node
7	Khon Kaen City Hall	26.7	Node
7	Railway Station	26.7	Node
8	Banglumpoo Market	24.4	Node
8	Nong Wang Temple	24.4	Landmark
8	Khon Kaen Stadium	24.4	Node
9	Police Station	22.2	Node
9	Khon Kaen Rama Hospital	22.2	Node
10	Municipal Market	20.0	Node
10	Government Centre	20.0	District
10	Bank of Thailand	20.0	Node
	Lines		
1	Klang Muang Rd.	71.1	Path
1	Srichan Rd.	71.1	Path
2	Mitraparb Rd.	62.2	Path
3	Na Muang Rd.	60.0	Path
3	Prachasamosorn Rd.	60.0	Path
4	Maliwan Rd.	46.7	Path
5	Lang Muang Rd.	40.0	Path
5	Railroad track	40.0	Path / Edge
6	Kaen Nakhon Lake Drive	35.6	Path / Edge
7	Theparak Rd. / Prachasamran Rd.	33.3	Path
8	Ruenrom Rd.	31.1	Path
9	Lao Nadee Rd.	28.9	Path
10	Lang Soonratchakarn Rd.	26.7	Path

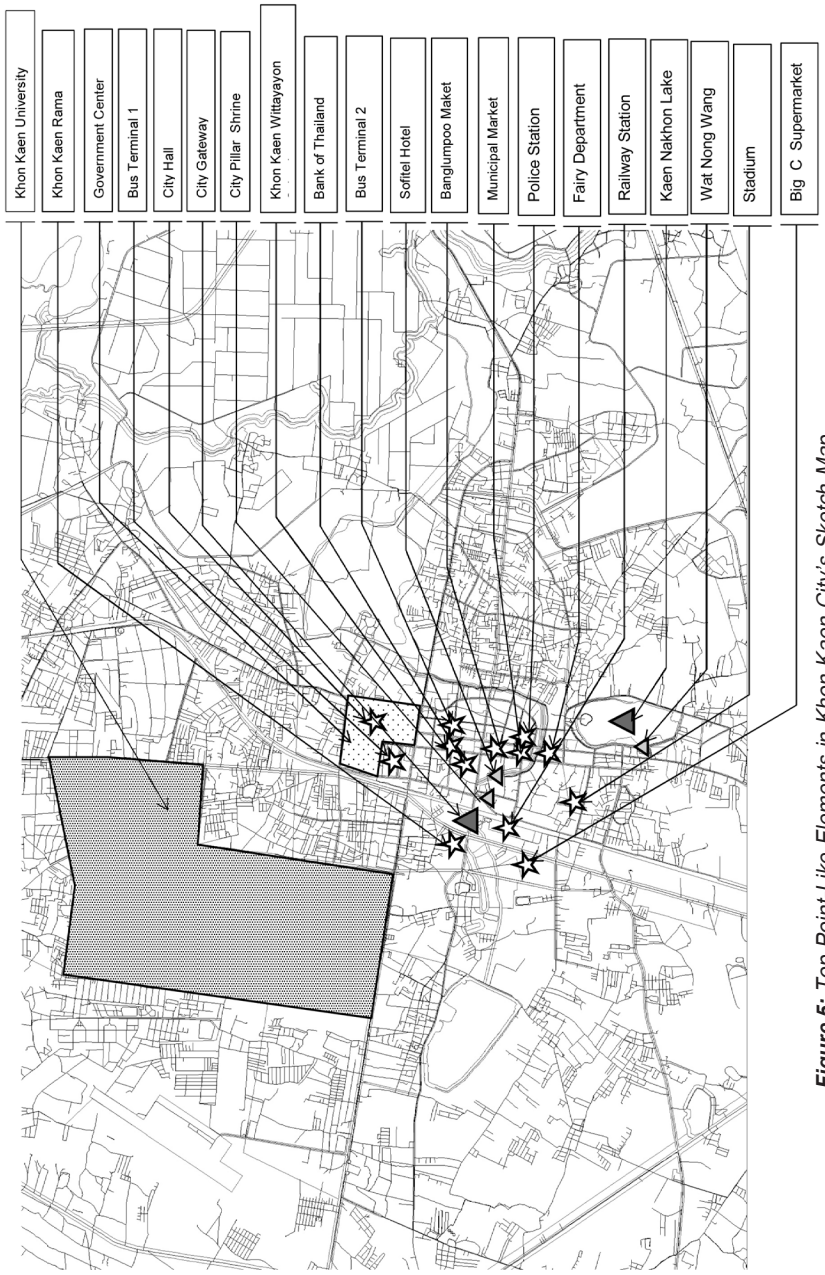


Figure 5: *Top Point-Like Elements in Khon Kaen City's Sketch Map*

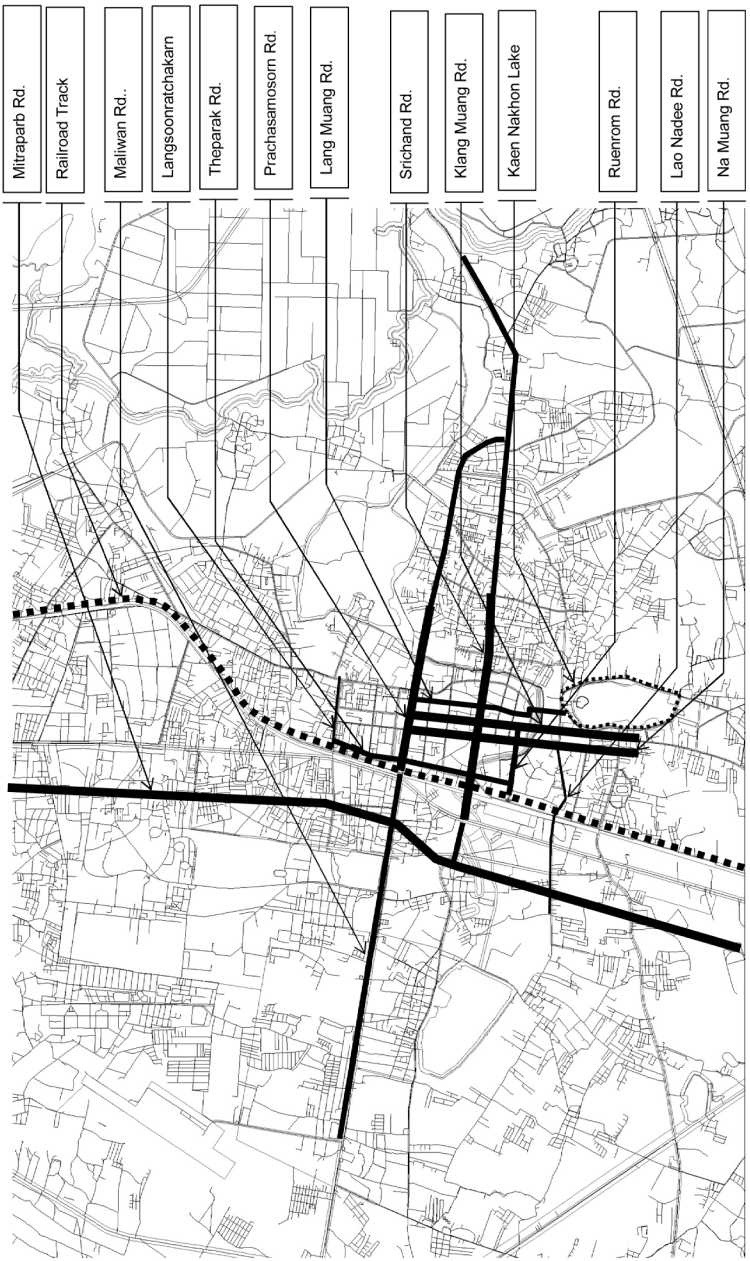


Figure 6: *Top Line-Like Elements in Khon Kaen City's Sketch Map*

3.3 Discussion and Conclusion

Cognitive Elements of the City

Nodes and paths are used most when compare to other elements. Node can be categorized into two forms according to activities taken place at the node. The first form, "junction" is the node functioning as the point of changing direction of travelling (e.g., bus terminal, circles, or distinctive intersections, etc.). The second form, "activity centre", is the node functioning as the centre of various activities (e.g., a department store and a market).

Path is the second kind of elements mostly used in sketch maps. Most referred paths are major streets in the city (e.g., Klang Muang Rd., Srichan Rd., Mitraparb Rd., Na Muang Rd., Prachasomosorn Rd., and Maliwan Rd.). Path element plays a vital role in public image of the city. Some obstacles to traffic though generate more complicated structure to the city; they make these streets more recognizable. For example, a circle on Srichan Rd. causes Srichan Rd. to be recognized as one of the most important street in the city due to its location of city pillar shrine, and the distinctive characteristics of the circle itself (i.e., 5-way intersection with city pillar shrine in the centre of the circle). Various activities along the street also are a major factor affecting the recognition of the street. Many respondents can draw a street on the sketch map without remembering the street name but be able to recall the activities taken place along both sides of the street.

Path apparently generating a sense of origin and destination can help people to generate the linkage between the area and the city as a whole and the path itself becomes more recognizable. Most paths respondents draw in sketch maps are paths that they can identify to and from where they live. Paths that have not such characteristics are disappeared from the public image (e.g., Kasikorn Thungsang Rd.) Continuity of the path also affects the

recognition of path element. It may be characterized by the continuity of shape and appearance of buildings, of activities, and of spatial quality. For example, most respondents draw Klang Muang Rd. only from the centre of the city to the south end of Lao-Nadee Intersection, though the street passes through the city further to the south. Since the width of the street has been changed at Lao-Nadee Intersection, the continuity of the street has been lost as well.

In the case of Khon Kaen City, edge is the element used least by the respondents. From the aerial photograph, ring road can be considered as a clear city edge. However, the finding from the analysis does not say so. The ring road is disappeared from the public image since it is too far and not corporate in the daily life of people in the city. It is Kaen Nakhon Lake and railroad track that is the most recognizable edges of Khon Kaen.

Landmarks of Khon Kaen City can be categorized into two types, local landmark and distant landmark. Most referred landmarks in sketch maps are local landmarks such as schools, temples, and specific shops. Distant landmarks are bulky public buildings with unique characteristics and can be seen from a distant such as Sofitel Hotel, Nong-Wang Temple, and Kanchanapisek Auditorium.

According to Lynch, district can be identified by “thematic continuation” such as texture, form, symbolic, type of buildings and activities, including the geographical characteristics and people living there. The spatial analysis of Khon Kaen indicates that district can be visibly identified by the continuation of activities and the uses of spaces. Some districts may be noticed by type of buildings within such as railroad residences, old town district, and new estate district. However, activities and the uses of space significantly affect the recognition of the district. Special districts, such as the government centre, the municipal market area, and the entertainment quarter,

are brought up in the study by respondents more than other districts. District is an element used least in the sketch maps due to the short distance and indifference between spaces in the city. The distance and distinction between spaces in the city are not enough to create “thematic continuation” of each space.

Distinctive elements and public image

Lynch indicates that the elements that have strong distinctive characteristics are those that people can recognize most. From Table 1, the results show that the city hardly has strong distinctive nodes and landmarks, though these two elements are frequently found in sketch maps. Existing nodes and landmarks mostly have “weak identity” (less-recognized). Most district elements in the city are not noticeable except university campus and government centre. City elements with “strong identity” (more-recognized) mostly are major paths such as Klang Muang Rd., Srichan Rd., Mitraparb Rd., Na Muang Rd., and Prachasamosorn Rd. It is noticeable that public image elements of Khon Kaen City mostly located in the centre of the city that is the commercial centre and high density residential area.

Distinctive elements in the city mostly are public spaces with visual essence significance resulting the high level of recognition among city residents. The results show that those top rank path elements also are the location of top rank point-like elements. For example, Fairy Department store, Kaen Nakhon Lake, and Bus Terminal1, and City Gateway are located on Klang Muang Rd., Kaen Nakhon Lake Drive, Prachasamosorn Rd., and Srichan Rd. respectively. Kaen Nakhon Lake Drive, the 6th rank among path-like elements, is one of the most recognized elements because of its unique characteristics running along the edge of the lake and its location of the distinctive feature, Nong Wang Temple. Besides, it is the path with

"visual pertinence," as called by Lynch (1960), since it is the route where people can catch sight of a major city's landmark. Kaen Nakhon Lake Drive has run around Kaen Nakhon Lake, one of the most popular public spaces in the city. There also are various kinds of recreational activities surrounded the lake along the Lake Drive.

It is the elements interrelation that enhances the quality of public image. In the case of Khon Kaen, paths play a vital role in enhancing the public image of the city due to the spatial relation between the path itself and other elements. There are some distinctive elements disappeared from the public image, because these elements cannot create the interrelation with other city elements. They are such places as Thungsang Lake, Nong Kotra Lake, and Kanchanapisek Auditorium. These places alone cannot help people form the linkage between itself and the city as a whole. It is "activities" or "the uses of spaces" that enhance the interrelation among city elements and create cognitive image of the city.

4. Spatial Accessibility and the Uses of Public Spaces

Urban morphology, the study of form, shape, plan, structure, functions of the built fabric and their partial relationships, is a major trend in the study of towns and cities (Madanipour, 1996: 53). This theoretical framework also contains historical development and the spatial structure of a city. Most importantly, it sheds light on crucial relationship between physical space and social actors. Among theories embrace 'space and society' Space Syntax is one of the most powerful as both a theory and a methodology. It argues that space is not the only by-product of society but something created in socio-cultural context (Hillier, 1996).

A key concept is 'spatial configuration' meaning relations that take account of other relations in a complex. Space Syntax centres on quantitative analysing this spatial configuration through computer modelling techniques on *axial*, *convex* or *isovist* maps. These maps are different characteristics of spatial property in any building or settlement. *Axial lines* representing the one-dimensional organisations or the longest and fewest straight lines of visibility and permeability that passes through all open spaces in the system.

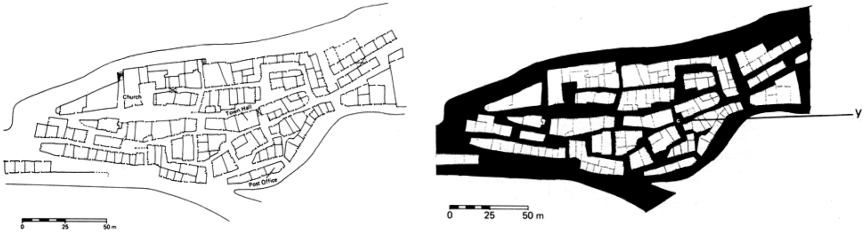


Figure 7 *A Small Town in Var, France (Left) and the Open Space Structure (Right) (Hillier, 1996)*

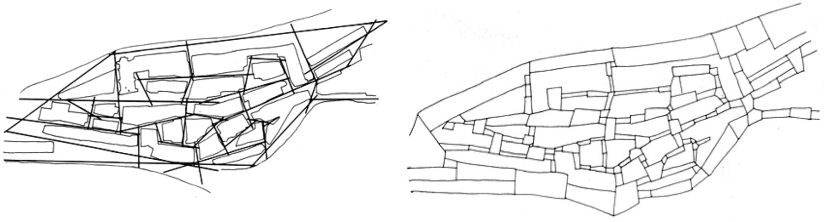


Figure 8 *An Axial Map (Left) and A Convex Map (Right) (Hillier, 1996)*

The computer modelling techniques can calculate the relation of each space to each other space in the whole system and interpret this in terms of 'integration value'. The 'integration value' of each line reflects its mean 'depth' from all other lines in the system. 'Depth' exists wherever it is necessary to go through intervening spaces to get from one to another, while shallowness exists where relations are direct. The measure of 'global integration', this section refers to, is the relative depth of each axial line to all other lines of the system.

One central proposition suggested by Hillier (1996: 52) is that the fundamental correlation of spatial configuration is movement. Space Syntax regards 'spatial structure' as a vital factor in the 'co-presence and contact' of people in the city. In other words urban life is the product of the global order of the system and the presence of strangers and inhabitants.

For Hillier (1996) the city centre, where most natural movements are observed, has relatively high global integration then the urbanization process is developed and as a result higher the local integration. He suggests the characteristics of the city centre are as follows:

• *Compact convex shape*: routes in the centre are short comparing to other areas

• *Alternative routes*: there are always other routes to go to a place in the centre

• *Small block size*: compact convex shape and alternative routes indicate small block size and this shows the higher accessibility than other areas

• *High area perimeter ratio*: for example a circle or a square, making shorter routes in the centre than routes in other areas.

This paper, deriving the concept of spatial configuration and the potential to promote 'life' of the city from Space Syntax, uses an 'axial map' as a fundamental tool to analyse urban public space locations, and the 'life' of the city. Thus, locations of public spaces of the city are drawn on axial maps to see how they are embedded in the urban fabric.

4.1 Route accessibility

Figure 9 shows axial maps of the global integration and the 10% integration core of Khon Kaen, while figure 10 shows the connectivity (r2) and local integration (r3), figure 11 shows route characteristics and figure 12 shows place locations on global integration map, respectively.

We can see that the routes in Khon Kaen have many characteristics according to the city development. They are as follows:

• **Super blocks with small curvy lines** which are the areas to the west of the Kaen Nakorn Lake, the oldest area of the city, the area between Pracha Samosorn (10) and Srichan (9) roads and to the north-east of the Kaen Nakorn Lake, the second oldest areas. These are the old areas in the early Rattanakosin reign of about 200 years.

• **Gridlines** are the extensions of the city in the second and third stage development, throughout the year 1968-1976. They are; the present city centre (Klang Muang, Na Muang and Srichan Roads) and the governmental office zone. The latest development area in this group is in the northwest quadrant of the east-west economic corridor and the Mitrapap Road junction where development was started after the establishment of Khon Kaen University in 1964.

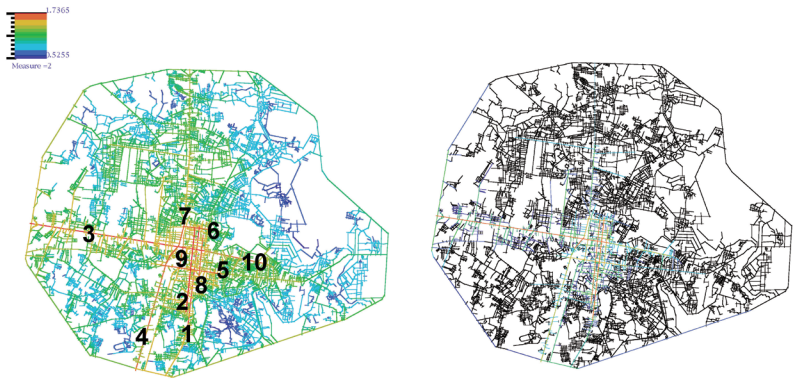


Figure 9 *Khon Kaen Global Integration Map and the 10% Integration Core*

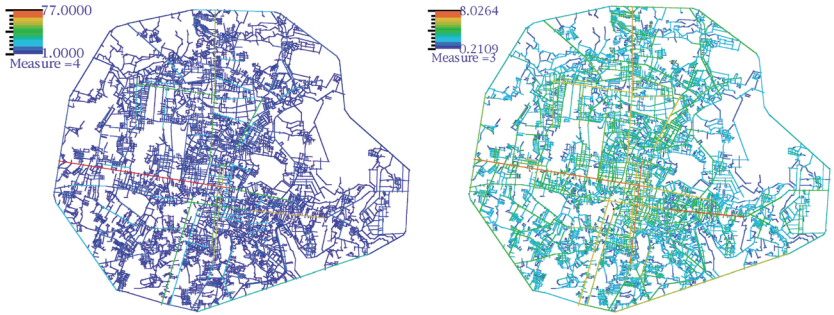


Figure 10 *Khon Kaen Connectivity and Local Integration (R3) Maps*

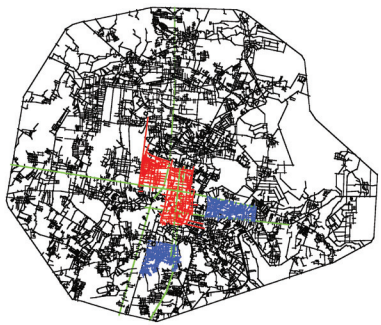
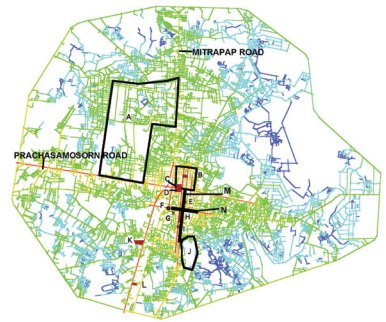


Figure 11 *Route Characteristics*

- *(1) (Super block with small lines*
- *(2) Grid*
- *(3) Long lines*



(A) Khon Kaen University (I) Fairy Plaza Department Store
(B) Government Office Zone (J) Khaen Nakhon Lake
(C) Bus Terminal (K) Big C Supermarket
(D) Au Jira Market (L) Tesco Lotus Supermarket
(E) Air-conditioned Bus Terminal
(F) City Pillar (M) Klang Muang Road
(G) Oasis Department Store (N) Srichan Road
(H) Bang Lampoo Market District

Figure 12 *the Locations of Major Urban Elements in Khon Kaen*

• **No pattern – the new developments** are the areas in northern quadrants to the west and east of the Mitrapap road. These are the areas with small lines adjacent to long integrated lines, similar to the first group. However, the lines are not as broken as the first group.

It is also observed that there are a number of very long lines comparing to other lines in the system. These are the east-west economic corridor (Maliwan-Pracha Samosorn Road, 3-10), Srichan (5), Klang Muang (1) and Na Muang (2). These routes are relatively new and are the top-five most integrated lines in Khon Kaen, as shown in table 1. The global integration values are 1.722, 1.678, 1.651, 1.736 and 1.724 respectively. Among these, only Klang Muang (1), Na Muang (2) and Srichan (5) pass through the city centre.

Moreover, from Figure 9 and Table 2, the 10% integration core reveals that the most accessible areas are the city centre and the governmental office zone, together with the long integrated lines mentioned above, as well as shorter lines, i.e.; the northern east-west route of the governmental office zone (Lang Soon Ratchakarn), and Teparak (the same direction as Pracha Samran Road).

Interestingly, the major routes in Khon Kaen University are those with high integration values showing their potential of high accessibility from other parts of the city. However, the university area does not well integrated with the city centre, rather a hub of its own.

Table 2 The Highest Integration Value Routes in Khon Kaen

Routes	Index	Rn	Connectivity	R_3
1 KLANG MUANG	389	1.736	56	6.935
2. NA MUANG	422	1.724	50	6.827
3. MALIWAN	2	1.722	77	7.538
4. MITRAPAP (S_1)	27	1.678	12	4.887
5. SRI CHAN (W)	42	1.651	40	6.464
6. LANG SOON RACHAKARN	367	1.649	20	5.430
7. MITRAPAP (N_1)	28	1.637	9	4.635
8. LANG MUANG	408	1.635	18	5.539
9. PRACHA SAMRAN	425	1.615	11	5.098
10. PRACHA SAMOSORN	1	1.595	39	6.352
11. MITRAPAP (S_3)	25	1.587	43	6.542
12. MITRAPAP (S_2)	26	1.580	8	4.029
13. TEPARAK	3911	1.563	6	4.541
14. KANG SATANNEE	419	1.553	8	4.763
15. MITRAPAP (N_3)	29	1.553	8	6.639
16. KLANG MUANG (S)	6182	1.552	43	5.000
17. KANG SUAN SANUK SCHOOL	6274	1.544	10	4.500
18. NA SOON RACHAKARN	405	1.541	15	5.135
19. KANG SOON PRACHUM KKU.	88	1.536	14	5.000
20. LAO NADEE	6253	1.534	10	5.006

Another interesting point to make is among the most integrated routes, not all that have high rates of pedestrian movements, they are concentrated in the city centre where markets and mix-uses are found especially Klang Muang (1), Na Muang (2) and Srichan roads (5). The rests are routes with high rates of vehicles rather than pedestrian movements.

4.2 Node and place accessibility

As nodes and places are along routes in the system, their accessibility can be measured from the integration values of the routes adjacent to them. The highest integration and mean values are used. Major nodes and places, as observed by the researchers, are plotted on the global integration map in Figure 10. These nodes and places are Khon Kaen University (A), the governmental office zone (B), the bus terminal (C), Au Jira Market (D), air-conditioned bus terminal (E), Oasis Department Store (G), Bang Lampoo Market District (H), Fairy Department Store (I), Kaen Nakorn Lake District (J) and the Big C (K) and Tesco Lotus (L) Supermarkets. The City Pillar Shrine (I) is also popular, visiting daily by many people especially during the rites and related events. However, it is still not comparable with other daily routine nodes and places such as Bang Lampoo Market and other department stores.

Table 3 The Integration Values of Streets Pass Heavily-used Nodes and Places in Khon Kaen

Public Places	Street names	Global Integration (Rn)	Mean Rn	Connectivity	Local Integration
1. Khon Kaen University	3 MALIWAN	1.722	1.6795	77	7.538
	7 MITRAPAP (N_1)	1.637		9	4.635
2. Governmental Offices	10 PRACHA SAMOSORN	1.595	1.685	39	6.352
	1 KLANG MUANG	1.736		56	6.935
	2 NA MUANG	1.724		50	6.827
3. Bus Terminal 1	10 PRACHA SAMOSORN	1.595	1.595	39	6.352
4. Au Jira Market	10 PRACHA SAMOSORN	1.595	1.595	39	6.352
5. Air-Conditioned Bus Terminal(2)	1 KLANG MUANG	1.736	1.736	56	6.935
6. City Pillar Shrine	5 SRICHAN (W)	1.651	1.651	40	6.464
7. Oasis Department Store	IN FRONT OF OASIS RD.	1.424	1.424	2	3.150
8. Banglampoo Market District	5 SRICHAN (W)	1.651	1.704	40	6.464
	1 KLANG MUANG	1.736		56	6.935
	2 NA MUANG	1.724		50	6.827
9. Fairy Department Store	1 KLANG MUANG	1.736	1.73	56	6.935
	2 NA MUANG	1.724		50	6.827
10. Kaen Nakorn Lake District	1 KLANG MUANG	1.736	1.736	56	6.935
11. Big-C Supermarket	4 MITRAPAP (S_3)	1.678	1.678	12	4.887
12. Tesco Lotus Supermarket	4 MITRAPAP (S_3)	1.678	1.678	12	4.887
13. Ruen Rom Evening Food Stalls	RUEN ROM	1.496	1.496	14	5.013

It can be said that major public spaces in Khon Kaen are concentrated in the *integration core* of the city. In addition, there are many supermarkets along the most accessible route, Mitrapap Road. The concentration in the integration core of the city includes hotels, restaurants, coffee shops, markets, small supermarkets and banks (see Figure 11). To use Ashworth's (1991) term, they are ***'functional agglomerations'***. These are functions supporting 'lively & diversely' public spaces. Note an intense location of restaurants and coffee shops and hotels around Beung Kaen Nakhon, a big lake near the old settlement of Khon Kaen.

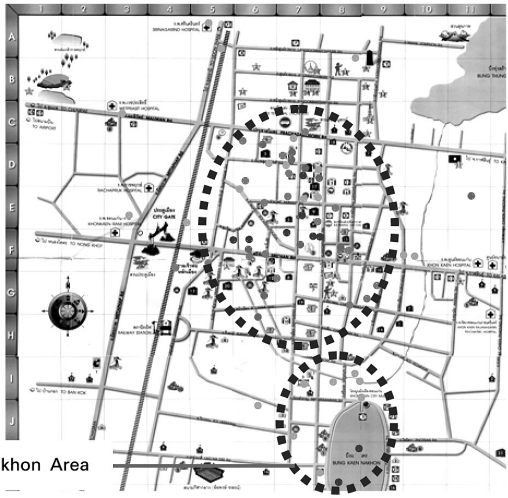


Figure 13 *Khon Kaen Functional Agglomerations*

For the street life of Khon Kaen, only Klang Muang Road (1), situating Banglampoo - the main market, and Srichan Road (5) are busy most of the times. A short part of Ruenrom Road at the south side of Banglampoo Market, with many food stalls, is active only after sunset. Among the major nodes and places, the ones that are in part of the city life are the bus

terminal 1, Au Jira Market, the air-conditioned bus terminal (2), the city pillar plaza and Banglampoo Market. The Beung Kaen Nakhon district is very busy in the evening with people aiming at exercise and eating-out, but at other times the area is rather quiet and not very many 'stop and stay' people are observed. Due to a long distance and no direct connections to other nodes and activities, it acts as a magnet and a hub of its own. On the contrary, the other magnets, Oasis and Fairy Department Stores, with their accessibility to other nodes and activities in the city centre, they reinforced the life of the adjacent streets. However, the effect is still in the minimum. The other nodes and places are magnets that have little impact to the city as a whole.

In summary, there are only two types of major public spaces in Khon Kaen; the *place of necessity* for necessity activities and the place for recreation and play that can be called *optional place* (Gehl, 1987). The first are the university, the government office zone, the bus terminals, markets and supermarkets, including department stores, though many optional activities occurred within. At the street level there are limited optional spaces, the food market after sunset at Ruenrom Road could be count as 'optional' as not only foods are sell and people can be relax in the place and be with other people in an undemanding way. The last are hubs for sports and recreations concentrated around Beung Kaen Nakhon and spread to other lakes and parks in the city.

5. Conclusion

It seems true that the making of good public spaces where we can describe as lively and diversely need a lot of factors and is complex. There is no one solution for all situations and all places. For Khon Kaen we can

summarize that both spatial accessibility and spatial cognition have contributed and non-contributed parts for the life of the city.

5.1 High accessibility & highly recognized

Contributed parts

The most integrated nodes and places along the most integrated routes are heavily used. These routes as well as nodes and places are also the most recognized elements. The routes are within the city centre; Klang Muang, Na Muang and Srichan, while the nodes and places are Fairy Department Store, Kaen Nakorn Lake District and the Bus Terminals.

Non-contributed parts

The integrated nodes and places and recognized elements with not many pedestrian movements are the city pillar shrine and the city gate. The causes are; the Shrine is an element of spiritual values and the city gate is only a landmark that is not in the daily routine of the people.

In the case of the Railway Station, it is off from the 10% integration core only one step and is in the top ten most referred elements in the image map but the area is not heavily used by Khon Kaen people. *From these two cases, it could be stated that though places are highly accessible or highly recognized it is the function that influence the use most.*

5.2 High accessibility but poorly recognized

Rachada Garden on the Pracha Samosorn Road (10), just on the opposite side of the Bus Terminal and Au Jura Market, is one of the least used places in Khon Kaen. Considering in details, we found that *the garden has very low visual links* with the surroundings. *It seems true, as Hillier's (1996) notes, that visual links is one of the factors for the use of public space.*

5.3 Low accessibility but highly recognized

Kaen Nakorn Lake is in this category. It is a centre for outdoor activities and recreations, including sport facilities, restaurants, coffee shops, as well as temples and shrines. With a high number of facilities and activities, the lake acts as a magnet and drawn people from all over the city and the vicinities. It can be stated again for this case that function is the key factor for the use of public spaces.

5.4 Observations and suggestions

In summary, spatial configuration is one of the first factors generating life of the city, as the city centre and almost all commercial activities and other facilities are on the 10% integration core of the city where the integration values are high. Within this basic positive feature that draws natural movements, then the public image or spatial cognition gains momentum. Other functions as magnets also correspond to the most integrated lines.

For the life improvements of Khon Kaen City, following suggestions are made:

1. Spatial cognition:

Physical characters play an unimportant role in shaping the public image of the city, but the functions or uses of public spaces. Good design of each element and linkage between them would strengthen people's memories and the legibility of the city.

2. Spatial structure of the city:

One of the major characteristics of the spatial structure of Khon Kaen City is the 'quiet hubs between high intelligible areas'. This is actually good for residential areas, at the same time near the city centre. It is one of the

qualities of a sustainable city where mixed uses reduce travelling costs and time. The other major disadvantage characteristic is the unconnected long lines, making inconvenient for people to travel or move within the city. Adding minor routes connecting the long lines would help in terms of spatial structure of the city. In addition, public transportation is needed for the promotion of natural movements.

3. The design of public spaces

The design of public spaces is an essential art that is not included in this study. Good design might lead to lively and diversely public space use. In addition, visual link is also an important factor for the use of public spaces. Private enterprises are also leading agents to promote good public space designs. If all parts help, the city would gain benefits and reach the stage of 'liveable' city in due course. It should be noted that lively and diversely public space uses would also strengthen the social meanings of those public spaces.

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