

# Conservation of Spatial Centrality: a Case Study of Markets in Ayutthaya Historic Town

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## ABSTRACT

 This article's objective is to examine the transportation networks and spatial centrality of the markets in the historic town of Phra Nakorn, Sri Ayutthaya. The ultimate aim is to provide information which can serve as the basis for establishing guidelines for the preservation of the historic town's spatial centrality in an Asian context. With rivers surrounding it, Ayutthaya town is located on a small island with historical buildings covering over 70% of the town's area. The town is considered an enclave of relict morphological units. The central trading areas cannot expand or grow normally. In addition, the connectivity of transportation networks in various areas is obstructed in different ways.

This research was based on the theoretical concept of urban morphology. Space syntax was used as an analytical tool to prove that the visibility potential and accessibility of transportation routes results from a connectivity of networks in the area. This was analyzed along with trade behaviors of those in the town's area. Study results show that the effective connectivity of transportation networks definitely affects the popularity of an area as well as the dispersal of various activities. Areas with higher visibility and accessibility than other areas have become trade centers in the spatial centrality process. Huaro Market is a case in point. However, even without favorable visibility and accessibility, trade attractors and other factors can also induce people to come to the area and result in the establishment of a market such as in the case of Chaophrrom Market. Nevertheless, trade activity may occur only sporadically or during certain periods.

An approach for the conservation of an historic town's spatial centrality thus has as an important condition; the thorough and systematic connectivity of transportation networks. The historical area must be integrated and unified with the town's transportation networks to optimize both the visibility and accessibility of the town's spatial centrality. This will allow a continual circulation of people as well as dense clustering of trade activity nurturing the liveliness of the historic town center.

**Keywords:** Market, Spatial Centrality, Spatial Configuration, Ayutthaya.

## INTRODUCTION

For a town with prolonged continuous growth that has allowed it to develop a historic district or an old town, especially one in the Asian context, the formation of the town center area starts with fine-grained urban fabric; facilities including public spaces, buildings and structures, and various traffic systems such as small scale transportation routes favorable to walking or small vehicles. There might also be water routes which were important in the past (Pinraj, B.E. 255). Because of these historical developments, the town area experiences limitations in terms of expansion or growth for providing services within the larger economic system. In addition, these areas tend to contain structures of historical and architectural significance such as historical sites, palaces, forts and religious structures, as well as old factories and warehouses. These structures are generally preserved to serve special purposes or be used for particular services (Rapoport, 1977: 101). As a result, such areas can be considered 'enclaves of relict morphological units' (Smailes, 1966). They are like barriers or enclaves in a historic town providing it with certain, specific spatial characteristics that prevent the town space and the central area from being expanded. Thus it is not possible for activities to spread further around traffic routes, unlike other towns. This is because the area is surrounded by strictly preserved historical sites. In addition, the traffic routes tend to be narrow and short and open areas are small due to the historical site barrier patterns. Moreover, in most old towns in Asia, as people's early reliance on waterways as main traffic routes changed with the development of land route networks, the land and the water traffic routes were not systematically connected, resulting in a less than desirable traffic network. The old town center thus becomes an insular area that is hard to access and does not support people's movement and inhibits ongoing activity, especially trade. This is how many old town centers stagnate and can no longer maintain their lively characteristics.

However, these central areas may remain stable or may grow, shrink, or shift. There may also be diverse areas which then grow together into a larger town (Hillier, 2000). The central areas of a historic town or district reflect a diversity of activities with no clear cut separation of functional areas. This is especially true where there are groups of shops along a road. The shop fronts are clearly seen among groups of old residential buildings, many of which have been modified or adapted for a

different level or type of use to support integrated or overlapping commercial or service activities. Conditions of some areas make certain activities unsuitable for them, particularly those depending on transportation, as these areas may permit only small vehicle access or foot traffic. In addition, in this kind of area, there may be old buildings such as factories, warehouses, government offices, schools and religious structures that have been in continuous use. At the same time, some types of buildings may no longer be in use. Such diversity in functional patterns is most intensively clustered in the urban core (Smailes, 1966: 86). This approach to making use of the land and buildings indicates the level of complexity and importance of activities as well as the relationship between activities that either support or conflict with each other. The concentration or dispersal of activities that occur may result from concomitant convenient access, which is always a prominent feature of a central space of a historic district (Conzen, 1981), which brings in competition from new forms of trade including a large number of modern and convenient shopping malls, department stores and supermarkets located all over the town

To preserve historic town centers, it is necessary to maintain transportation routes allowing access from surrounding areas, both near and far, which benefit the local economy. As proposed by Hillier and Hanson (1984), such transportation networks and public spaces systematically and thoroughly connected will enable people with different purposes and destinations to move to or through other areas in this way, diverse socio-economic activities result and spread in accordance with the access potential described in the concept of 'spatial centrality as a process' (Hillier, 2000). This also reflects the concept of 'natural movement' (Hillier et al., 1993), which results from people moving naturally at different levels according to the nature of the connectivity of the spatial network in the area. Different areas thus may offer either good or poor access based on the circumstances. An area with poor access would attract activities requiring calm and quiet such as those which are residential-related, while an area with better access would attract trade or social activities. As a result, activities spread out unequally under the concept of movement economy (Hillier, 1996). In other words, in a location where there is a high level of natural movement, activities are more clustered than in the area with a low level of natural movement. Also, there are often clusters of trading activity in the town center as it is more open for the benefit of customer or community traffic. Trading activity serves to

attract a higher level of movement resulting in even more varied trade, reflecting a multiplier effect. Consequently, the network is enhanced and traffic flow is facilitated, particularly to help speed up the movement of crowds of pedestrians. In the town center there is thus grid intensification and activities are more concentrated than in other areas. This transforms it into a bustling commercial area along with general space for other kinds of activities and uses. These uses include residential housing which spreads out over the area naturally, resulting in a sustainable 'lively town center', unlike modern trade outlets including malls and food franchises that are often clustered at highway intersections

In the case of Ayutthaya Historic Town in the central region of Thailand, the town was important in the past as the center of the Kingdom of Siam during the period of 1351-1767, before it was destroyed by war. The capital of the Kingdom was later moved to Thonburi and then Bangkok. Ayutthaya itself has undergone significant development and changes over the past 600 years. With the historical development of settlements due to its location on the Chao Phraya Delta, the area is located on an artificial island encircled by the Chao Phraya, the Pasak, and the Lopburi rivers (Klong Meang) with the Chao Phraya as the main river, and is known as "Ayutthaya Island". First abandoned as the island city capital of Siam, it then became reoccupied as a provincial capital in modern Thailand tied by road networks to the new capital in Bangkok 60 km to the south.

During the Ayutthaya Period, (1351-1767), the town made use of a large number of natural waterways and constructed moats as a defense against enemies. These also served as the main transportation routes. Some people lived on raft houses while others built houses on river banks. The people would then bring their food and consumer items around in boats to trade, forming "Taladnams" or 'floating markets' at various points along the waterways within the town island. Meanwhile, along the banks were "Pa" or "Taladboks" or "land markets", for which a large number of handicrafts were produced and distributed both on and off the town island. Northeast of the town where the major rivers meet, a wooden bridge spanned the rivers at the only point of crossing called "Huaro". Here paths, used to bring in cattle crossing the river for sale on the island, met. This area thus became a large community with both floating and land markets. During this time, Ayutthaya was flourishing with trade especially as a port town conducting commerce with various countries both

in Southeast Asia and Europe. This was due to the location of the town and the waterway networks that favored convenient transportation. Ayutthaya was thus a water-based town and was referred to as the Venice of the East (Winai, B.E.2551:27; Thawatchai B.E.2549; Department of Fine Arts, B.E.2545).

Not long after, the town was destroyed and throughout the Thonburi period (1767-1782) and current Rattanakosin period (1782-present), people have come back and resettled in the area. After 1850, Ayutthaya again became a bustling town whose inhabitants still largely lived as a water-based town society, residing on boats, rafts or on the river banks. They still frequently traveled around by boat as well as carried out trade along the waterways or along the banks. Rivers, canals and town moats as well as long established roads were still made used. However, communities remained mainly located along the river surrounding the island. Further into the island, forest areas were intermingled among archeological sites. It was not until 1950 that the government began to develop plans for the town following the government's national development policy to maintain the population of the town island. As a result, a town plan was developed; roads and concrete bridges were built connecting the island with outlying areas. People then started moving from their raft houses to live along the river banks and in the interior as it became more convenient to live there. As a result, reliance on waterways for transportation and trade gradually reduced. Commercial centers also relocated to land markets and into wooden or concrete buildings. At present, there are neither floating markets nor people living in boats or on raft houses. Most housing is now clustered in the available area around historical building conservation sites, with all houses looking onto the roads. Government offices are located along the roads, and rivers around the island. The main rivers are still used for transportation of goods and some traffic, but the smaller waterways within the island have been filled and made into roads or building sites. The two waterways left are now used for drainage purposes. In addition, roads as well as wooden and concrete bridges have been built around the town island. Most of the town inhabitants thus travel around by bus, ferry, small vehicles, and on foot as it is more convenient. Ayutthaya therefore can be considered as having become a land-based town.

At present, the town features two central areas, namely Huaro Market and Chaoprom Market. Both markets play a role as a commercial center but have

developed differently. Huar Market is a market that formed in a location which has had a land and waterway junction from the time of Ayutthaya period. Later during the early Rattanakosin period, there were still traces of a road network connecting with the major rivers. Around 1830 this area became a site for settlement and trade when people began to move back. There were then both floating markets and land markets along the water. These markets developed further from small wooden buildings to the present concrete ones. As they are accessible both by land and water, people within the community as well as those from nearby communities and from outer areas visited continuously, especially on foot or by using small vehicles.

Trade in the area of Chaoprom Market started with the establishment of the market in the form of permanent buildings around 1980. As it is situated on the main road of the island town and is outside the conservation area, it has been possible to develop commercially. Thus nearby areas have various facilities including government offices, bus terminals, ferry piers, and houses, which host a variety of activities.

Both markets still serve as 'important commercial centers' of the town although Ayutthaya has limited space and is subject to numerous regulations regarding commercial development. These factors are what prompted this analysis of the spatial

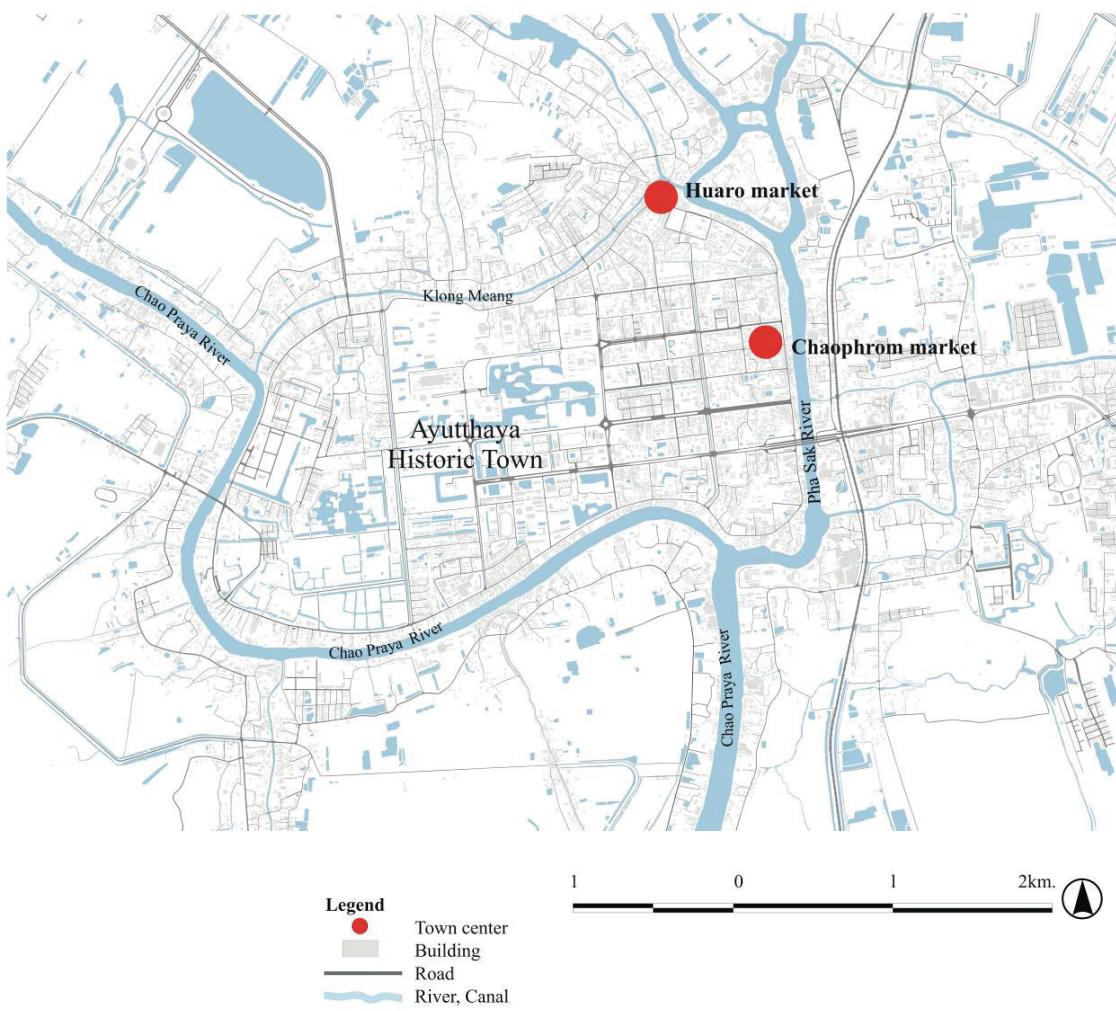


Figure 1:  
The position of the central area of Ayutthaya Historic Town (Department of Public Works and Town & Country Planning)

centrality of the historic town, using urban morphology in the spatial analysis as well as space syntax. These concepts can systematically prove and confirm the accessibility of transportation networks both as a complete network and of individual routes. The analysis results of the two markets along with comments of residents regarding transportation and shopping behaviors can then be compared and studied. The purpose is to understand the spatial centrality process of the two markets in their role as central areas which feature different formation patterns, locations, as well as socio-economic factors, and also how they carry on their role of providing commercial services.

The issues under study are as follows: 1(What are the characteristics of the spatial network and spatial centrality of the markets? What are the underlying factors resulting in such characteristics? 2 ( How can the two markets maintain their spatial centrality? It is anticipated that the body of knowledge gained from the study will be of use in planning the conservation, rehabilitation, and enhancement of this historic town so that the market areas can continue to be 'lively town centers' into the future. This knowledge can also be applied to other historic towns in the Asian context.

## THEORIES AND RESEARCH METHODOLOGY

This study relies on spatial analysis as the principal analysis tool coupled with an analysis of activities that are reflected in the patterns of use of buildings and land. Questionnaires were also used to obtain opinions of people in the localities.

### Spatial Configuration Analysis

The spatial configuration analysis looks at the patterns of transportation networks and spatial centrality by creating a model depicting the spatial and transportation networks based on the geographical information system. Computer programs were used to predict the traffic patterns in urban areas according to the concept of urban morphology (Hillier and Hanson, 1984). The principle concept is that the nature of transportation route connectivity always relates to the traffic level and the popularity of the routes in the community or the town. People tend to choose the most direct and the shortest route. In the model, axial lines represent

people's movements, linking each other in convex spaces where people can walk to and see each other. In fact, an axial line is the longest line of sight and access through an open space. Axial lines are connected within the entire network systematically to make an axial or spatial model map. The spatial model of the town area is thus created and Space Syntax computer software is used in analyzing the axial map (Tuner, 2007). This is done to determine which route has the highest integration value or an urban fabric integration level higher than other areas. These routes are represented by red lines, followed by orange, yellow, green, and light blue lines as in the rainbow color spectrum. Meanwhile, the routes with the lowest access potential or which are segregated from the urban area in general are represented by blue lines representing a low level of traffic or low integration.

Analysis of a town's axial map should produce lines of all colors, from red to blue, to show that the town's movement network. The map shows potential movement of various levels, from high access to low access, depending on the nature of connectivity of the network. This is an important characteristic of good spatial configuration. In particular, the town center or market area should feature 'hot' color lines to show that the movement network has a high integration value and is 'a lively town center' according to Hillier's concept of spatial centrality as a process (Hillier, 2000).

### Building and Land Use Pattern Analysis

Building and land use pattern analysis was done to look at the characteristics of socio-economic activities using the geographic information system (GIS), comprising layers of information including the building use layer, land use layer, road layer, hydro layer, open space layer, and building layer. Color symbols were used to represent different types of activities shown in the form of a 'pattern of use of buildings and land map.' A survey of the area where activities actually occur was also conducted from the months of July to December 2011. The purpose was to understand people's lifestyle by studying their activities on site. This would indicate interrelatedness or conflict, and to study the concentration or the dispersal of activities, especially the clustering and the subdividing of building block areas where trade is conducted. In addition, where hot color lines appear in the spatial model, commercial

activities or markets should show up on the pattern of use of buildings and land map. This is the basic characteristic of a town center area. It demonstrates that the markets are located in a suitable space or possess spatial centrality. On the other hand, cool color lines appearing in market areas are indicative of various socio-economic factors which relate to the use of surrounding buildings and land and can be determined by asking local people frequenting the markets to complete a questionnaire.

## Questionnaires

Questionnaires were used to acquire qualitative data that could not be acquired by other means. People living in Ayutthaya Historic Town communities were asked to complete the questionnaire providing some personal information and then giving information regarding their modes of travel, spending habits and the types of goods purchased. The persons asked to complete the questionnaire were to be the head of the household or wife. A total of 9,154 households in 62 communities were given one questionnaire each. The questionnaire was administered using Taro Yamane's sampling selection at 95% confidence level. A total of 384 sets of questionnaires were completed by the random sampling group of 384 households. The data was collected during the period from July to December 2011.

## THE SPATIAL CENTRALITY OF AYUTTHAYA HISTORIC TOWN

### Open Space Network and Spatial Centrality

The spatial model of Ayutthaya Historic Town covers an area of about eight square kilometers (5,000 rai), reaching to the AH1 Highway in the east, along the highway in the northern direction and then extending to state highway # 347 in the west and state highway # 356 in the south. The model depicts roads, side streets, alleys, walkways, shortcuts, open grounds, and temple grounds. It also shows rivers and streams as well as linking points that are bridges and ferry piers that the public can use freely. As can be seen in Picture 2, the spatial network is divided into two areas: the historic town area and the area surrounding the historic town. The two areas are separated by the Chaophraya, the Pasak and the Klong Meang rivers rendering the historic town area

simulating an island and thus it is generally referred to as 'the historic island'

The historic island is the first area in the spatial network and is on a grid system with the major roads of Rojana Rd., Pa-tone Rd., Bang-ian Rd., Naresuan Rd., Pa-maprao Rd., Klong-thor Rd., Pa-tong Rd., Klong-makamriang Rd., and Chee-goon Rd. These roads meet with U-thong Rd., or the road running around the historic island, along the river that surrounds the town. Meanwhile, the other area of the spatial network, the 'area surrounding the historic town,' has state highways #s 309, 3053, and 3263 comprising a linear structure connecting it with the island almost at a perpendicular angle with numerous bridges and ferry piers: six concrete bridges, eight pedestrian bridges made of wood, steel, and concrete, and 12 ferry piers (Survey, 2011). In addition, along the major roads are large numbers of side streets, giving them a fishbone structure, particularly those roads that run parallel to the riverside area.

The result, based on the analysis as shown in Figure 2, is clear that the area with the hottest colors, red and orange, is in the northeast area of Huaro Market. This is considered the area with the best potential for both move-to and move-through traffic due to the concentration of a large number of routes. Also, the innermost area or urban core has a road system with grid intensification, putting it in a position with the best move-to potential. Meanwhile, routes in most other parts of the town, especially in the area of Chaophrrom Market, are shown in warmer colors to cold colors, yellow, green, light blue, and blue. This is because most are dead-end, short roads branching off of the main roads. These short roads are also scattered, resulting in low potential. The warm color area, yellow, indicates places that connect the outer and the inner areas of the historic island. These routes are not as clustered as in the northeast but start from various communities in the area. The yellow area is considered as having moderate access potential.

Regarding both the move-to and move-through traffic potential, it may be concluded that most people in the town tend to choose the Huaro Market area as their destination for certain activities over all other areas. These activities likely include trade. This area is also chosen for move-through traffic, possibly because it is a point connecting land and water traffic patterns and also connects the inner and outer areas of the historic island with U-thong Road as a major road. In the meantime, Chaophrrom Market is in a position

with low potential. Few people therefore choose to take routes in the Chaophrom Market area for either move-to or move-through purposes. However, as it is situated on an important road and has trade activity as an attractor, some people still visit the Chaophrom Market area. Analysis of building and land use patterns is to be conducted in the next stage. A survey will also be conducted to gain opinions of people in the area.

## Nature of Socio - economic Activities

Over 70% of the land on the historic island is occupied by historical sites, especially in the center of the island designated as 'the historic town of Phra Nakorn Sri Ayutthaya' in order to preserve such sites. The area thus cannot be developed economically as with other town centers. Because of this, the town centers or markets had to form in other areas.

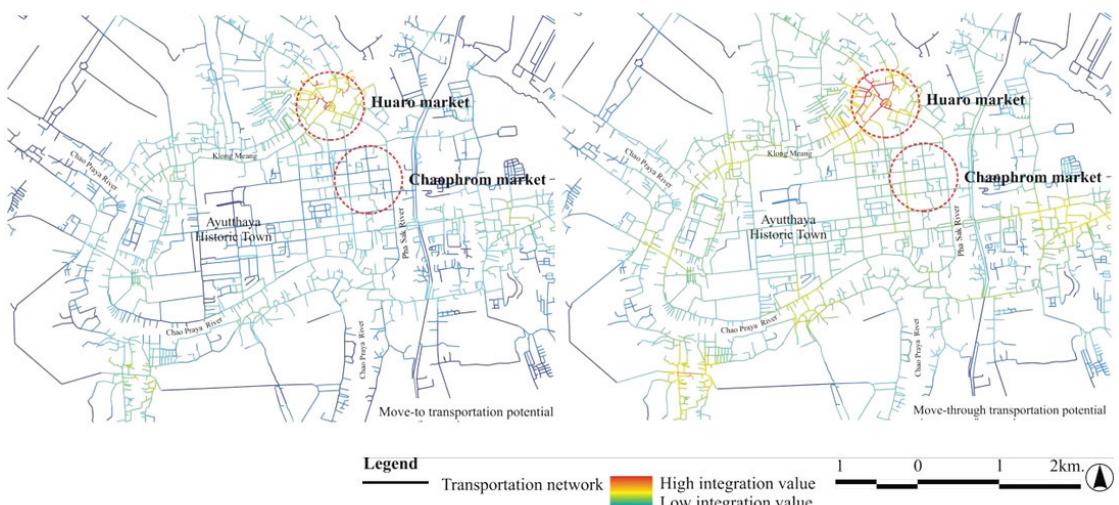


Figure 2:  
The spatial model of Ayutthaya Historic Town and the spatial centrality

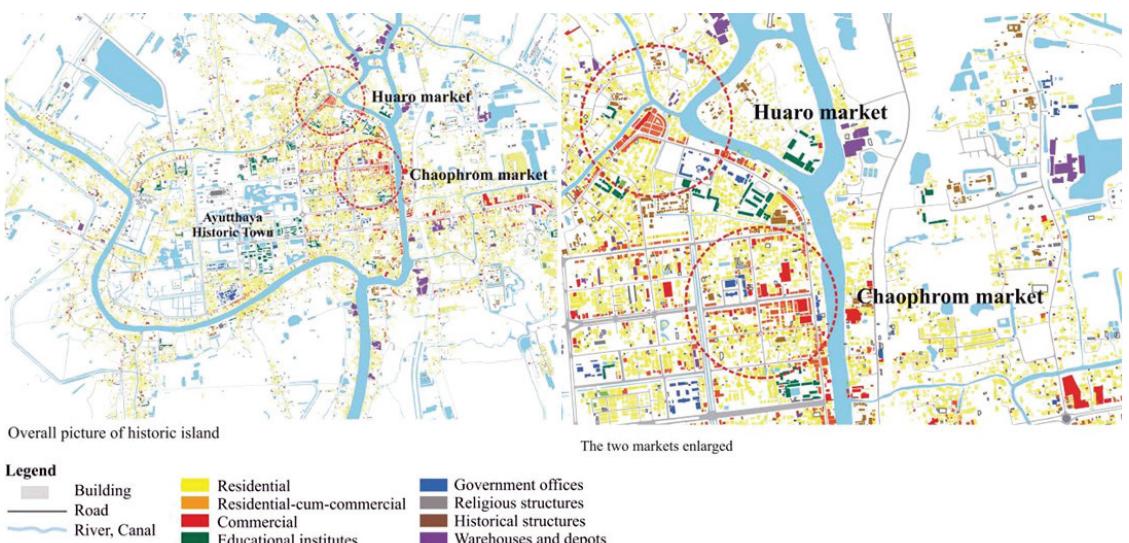


Figure 3:  
Patterns of building and land use in Ayutthaya Historic Town (Department of Public Works and Town and Country Planning)

Town development policy has determined that the area in the east of the island would be developed into a residential-cum-commercial area. As a result, Huaro Market, Chaophrom Market, governmental, educational, and residential centers are clustered in this part of the town (Figure 3)

Huaro Market is located in the northeast of the island where the Lopburi River and the Pasak River meet with several routes connecting outlying communities with the island. The inner area of the market links with the roads going out to those communities. Each route meets with U-thong Road which cuts through the various communities on the island. In the market, there is network of walkways, which also allows for transportation by small vehicles throughout the area in a grid system that corresponds with the building blocks. The transportation routes in the market and the surrounding areas are generally well-connected thus providing a network promoting trade activity from the outer roads to the innermost area. This is

especially true on days when there is an occasional market where food, fresh fruit and vegetables vendors cluster in the front of the market and along the walkway in the market.

Some shops are open 24 hours a day, 7 days a week. Thus the market area is not a place for trading goods only during business hours. People are moving in and out of the area at all times of day and night. Goods and services available in the market area include fresh food, dried food, ready-to-eat meals, and consumer products. There are also barber shops and beauty salons, dressmakers' shops and other small trades. Additionally, in the spaces surrounding the market are rather old buildings which are open as shops selling traditional medicine, supplies for monks, gold ornaments, conventional medicine, electrical appliances and equipment and food. There are also doctors' clinics, as well as modern day service business (Fig. 4).



Trade activity



Old buildings around the market



Sunday Market

Figure 4:  
Trade activity at Huaro Market

As for Chaophrrom Market, it is situated in the east of the island at the intersection of U-thong and Naresuan Roads, near the Pasak River where a ferry crosses to the Ayutthaya Railway Station. There are also other establishments in this area such as the municipality office, medical service centers, temples, shrines, the bus terminal, the railway station, and a department store, all of which attract people to the area. The Chaophrrom Market itself is a large building on U-thong Road, the inside of which is divided into sections with small walkways. It is quite a distance from the outside to the inner trading area, causing some of the inner area to be vacant as customers do not like to go deep inside. Some of the vendors have moved to conduct their trade outside. Also, surrounding the market are commercial buildings along U-thong Road and Naresuan Road, and trade activity is thus concentrated along the roadside, with traffic jams of both market shoppers

and commuters. However, after office hours and at night when the market, shops and other places are closed, the area becomes deserted until the next morning. As for types of goods and services offered, mostly the market sells fresh food, dried food, ready-to-eat meals, prepared-as-ordered food, wholesale goods, fashionable clothing, gift shops as well as consumer goods. Surrounding the market is a department store plus commercial buildings with shops selling conventional medicine, electrical goods and appliances, fresh flowers, fast food, and medical and other services (Figure 5).

It is noted that the two markets feature different trading practices and types of goods. However, both are popular, major commercial centers with a lot of visitors. This has prompted the researcher to explore the factors or reasons why people choose to shop for goods and services at these two markets by using a questionnaire in the next stage.



Trade activity



A department store and commercial buildings around the market



Trade activity around Chaophrrom market

Figure 5:  
Trade activity at Chaophrrom Market

## Local Opinions Regarding Town Centers

To obtain local views, questionnaires were completed by a random sampling group of local people in Ayutthaya Historic Town communities. 384 people were asked about their decisions regarding shopping in the two markets. Out of these, 222 people were Ayutthaya natives while the other 162 were those who have moved from other areas to live, go to school, work or travel. The findings are as follows:

a. Frequency: Most people visit both markets once or twice per week on average. When they do not

get to visit the market, they buy from shops in their community or from the occasional market in the community area.

b. Types of goods: Most people prefer to buy food and necessary household products at Huaor Market and to buy clothing, personal care products, and electrical appliances at Chaophrrom Market (Table 1). Their reasons are that at Chaophrrom Market there are large selections of modern, fashionable goods. It is near their workplaces and government offices and is also convenient in terms of transportation as it is near the bus terminal. On the other hand, people visit Huaor Market because they are familiar with

**Table 1:** Types of goods people choose to buy from the two markets

Types of goods	Huaor Market		Chaophrrom Market	
	Number of shoppers	%	Number of shoppers	%
1) fresh food	178	46.35	206	53.65
2) dried food	243	63.28	141	36.72
3) clothing items	137	35.68	247	64.32
4) household goods	189	49.22	195	50.78
5) personal care goods	134	34.90	250	65.10
6) electrical goods	117	30.47	267	69.53

**Table 2:** Patterns of transportation to the markets

Types of transportation	Huaor market		Chaophrrom market	
	number of people	%	Number of people	%
Walk	51	13.29	38	9.90
Bike	34	8.86	18	4.69
Motorcycles	117	30.49	101	26.30
Engaged motorcycles	76	19.80	73	19.01
Bus	54	14.01	78	20.31
Car	37	9.64	76	19.79
Ferry boat	0	0.00	0	0.00
Boat rental /Boat	15	3.91	0	0.00
<b>Total</b>	<b>384</b>	<b>100</b>	<b>384</b>	<b>100</b>

**Table 3:** Transportation routes people choose to reach the markets

Route to Huaro Market	Number of people	%	Route to Chaophrrom Market	Number of people	%
U-thong Road	178	46.35	U-thong Road	163	42.45
The road from Wat Mae-nang-pleum	142	36.98	Naresuan Road	134	34.90
The road from Wat Sam-wiharn	54	14.06	Side streets near the market	49	12.76
Rivers and canals	10	2.60	Ferry	38	9.90
<b>Total</b>	<b>384</b>	<b>100.00</b>	<b>Total</b>	<b>384</b>	<b>100.00</b>

the vendors since they have been doing business with them for a long time. The market is also convenient for them to reach and near their homes. Moreover, there are more local wares available than at Chaophrrom Market.

c. Types of transportation: People travel to the markets in many ways, sometimes depending on the quantity or the types of goods to be purchased. However, the use of a motorcycle is the most frequent method (Table 2) due to its convenience and ease of finding parking. It is also easy to change transportation modes such as taking a ferry. Another popular form of transportation is buses. However, a higher proportion of people go to Huaro Market on foot or by boat compared to Chaophrrom Market, which people prefer to go to by car.

d. Routes chosen: The preferred route to go to both markets is U-thong Road. However, to reach Huaro Market, one can use the roads in the area of historical sites, namely the road from Wat Mae-nang-pleum and the road from Wat Sam-wiharn, which are in communities where people can use small vehicles or walk. On the other hand, one generally must reach Chaophrrom Market via the main roads (Table 3).

## SPATIAL CENTRALITY AS A PROCESS IN AYUTTHAYA HISTORIC TOWN

The analysis in the earlier stages reflects differences between the two markets in terms of spatial network, spatial centrality, socio-economic activities occurring in the area as well as people's opinions. The analysis of results shows the spatial centrality as a process of the two markets as follows:

### Huaro Market

Huaro Market is located in an advantageous position which can be reached by both land routes and water routes. Around the market are historical sites which support people's free movement. These routes have been integrated and become a spatial network that connects the market to places both near and far. People can therefore choose the most convenient routes in this area for their shopping trips.

The area where there is a high level of traffic, especially in front of the market, there are clusters of certain trade activities that require freedom of movement such as food-related goods. In contrast, the area with a lower level of traffic, which is inside the market, features activities not really requiring movement. These activities are conducted at shops such as dressmakers and barber shops, which generally have regular customers or are in a location well-known to people in general. Various types of trade are thus scattered throughout the area according to the level of movement required.

The market area with a high density of movement attracts other trade activities such as carts or stalls selling miscellaneous items. Some vendors may even simply display their wares on the ground. Such activities have had a great effect on the cluster, requiring a more intricate spatial network to facilitate movement. This causes the inner part of Huaro Market to have a dense spatial network while spreading out into the surrounding areas in various directions and allowing surrounding communities to have easy access to the market at the same time.

As Huaro Market, unlike other markets, offers a variety of goods including food, everyday items and local goods, it has become 'a community market' which is highly frequented by people for daily

needs. This involves simple social transactions with bargaining or buying from well-known vendors or familiar shops. Such trade activity leads to a long-standing relationship, creating respect and trust between both parties. This helps develop the relationship and adds to Huaro Market's old town or historic identity.

The points presented above demonstrate the process of spatial centrality as it exists at Huaro Market, which is an important factor that enables it to maintain its status of 'a lively center.'

## Chaophrom Market

Chaophrom Market is situated in an advantageous location that attracts a large number of people either moving to or through it due to the surrounding area containing important buildings. However, these buildings form a closed area which is segregated from the market so people cannot reach the market easily during rush hour. Mainly they have to rely on U-thong Road and Naresuan Road causing heavy traffic and traffic jams. Also, some people have to come by car or motorcycle while others need to walk because the public transportation network in the area does not provide much choice.

Chaophrom Market is situated among large urban blocks of U-thong Road, Naresuan Road, Rattanachai Road, and Klong Makamreang Road. Therefore, the inner area of the market is hard to reach, making it unpopular for customers. Some

vendors have thus had to move to the outer area to conduct their trade, leaving the inner area deserted. As a result, trade has become clustered in the area outside along the road and sidewalks. In other words, trade does not spread out in the area and is dependent upon the level of free movement.

Trade is bound by the time period, i.e. the market is open during the daytime only, like the government offices, educational institutes, companies, and the ferry pier, which have their own hours. As a result, after they close for the day when the market and shops also close, the area becomes quite deserted until the next morning. As a result, it is not well-suited as a central area that supports free movement to and from the area or for people circulating within it.

It is a market that is important to the town's economy as a trade network involving a large number of people. Trade transactions are more systemic or standardized in nature than those at Huaro Market and as such do not allow for much informal transactions or bargaining. The success of businesses or shops thus depends more on their goods than on the relationship between vendors and customers. To attract people to this market, there needs to be a wide selection and large quantity of up-to-date goods.

The points above reflect the fact that Chaophrom Market continues to exist due to its attractors, which are either trade factors or other factors not related to the process of spatial centrality. As a consequence, this market may not be able to sustain its centrality if the attracting factors change.

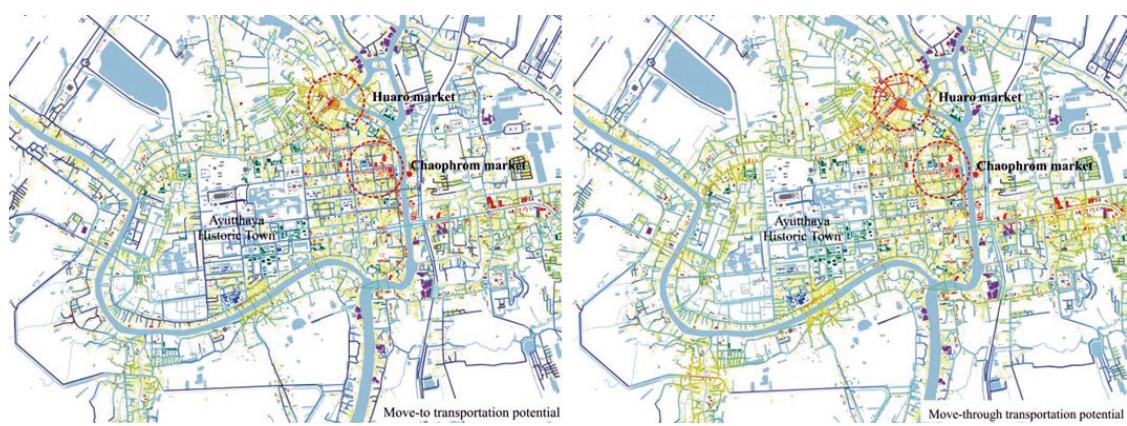


Figure 6:  
Comparison of spatial network values and patterns of use of land and buildings

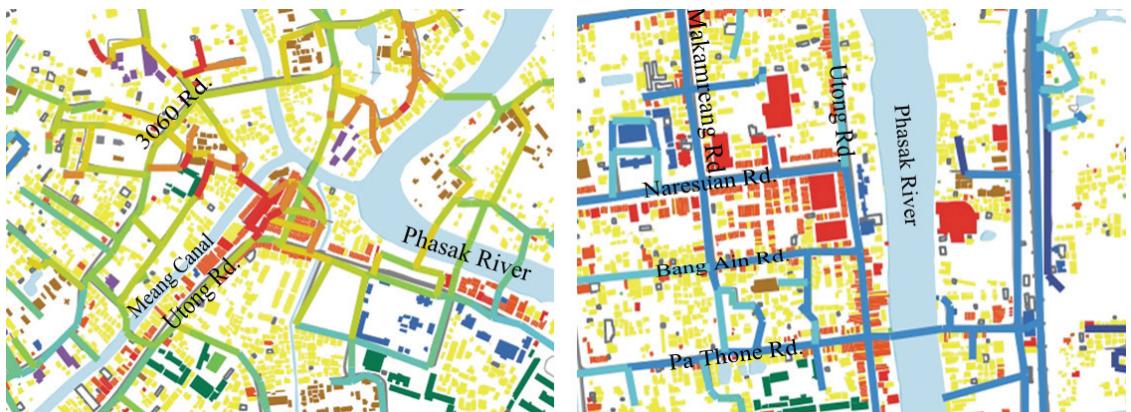


Figure 7:  
Map showing move-to routes to the town center and potential transportation expansion

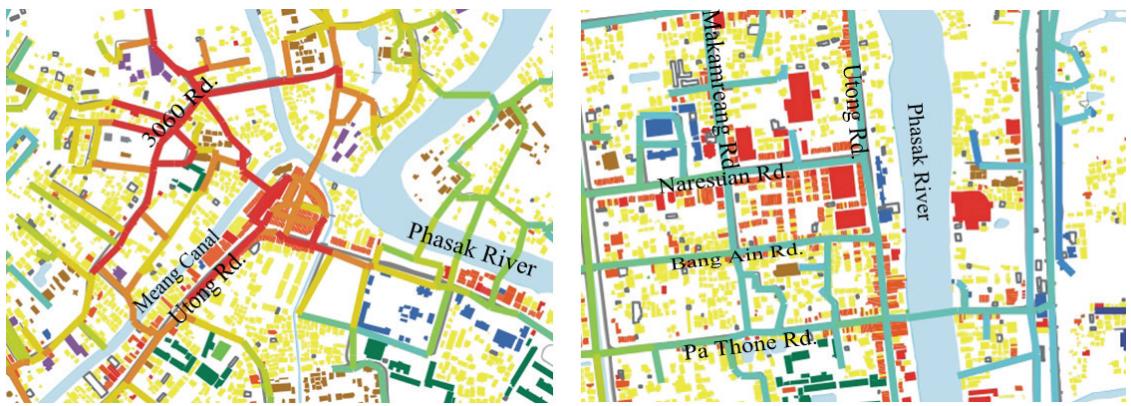


Figure 8:  
Map showing move-through routes to the town center and potential transportation expansion

## CONCLUSION AND RECOMMENDATIONS

The research results show that the markets in the historic town of Ayutthaya, as being representative of spatial centrality in the Asian context, can exist due to the spatial centrality process as in the case of Huaro Market and can exist due to trade attractors and reliance on other activities as in the case of Chaophrrom Market. This results from the different spatial configurations and effective transportation network connectivity. The space syntax analysis results clearly show that regarding Huaro Market's spatial configuration, the market is in a location with better visibility and accessibility than other areas, especially than Chaophrrom Market, which is on a main road but with much poorer visibility and accessibility. This is due to the fact that people can

access or move through Huaro Market conveniently. Also with good visibility, the market and surrounding area are favorable for trade as well as other activities throughout the area. Meanwhile, Chaophrrom Market features large enclosed buildings on the main road, with trade clustering only on the outside and along the road.

Therefore, the theory of spatial centrality as a process is confirmed, indicating that the effective connectivity of transportation networks affects the popularity of the area, as it supports access and the spreading out of various activities. The areas with high visibility and accessibility would become town center areas with trade activity. However, products, atmosphere, environment and other factors can also attract people to an area that has no favorable visibility and accessibility, although only occasionally or during certain periods.

An approach for the conservation of a historic town's spatial centrality thus has as an important condition; the thorough and systematic connectivity of transportation networks. This includes factoring in the historical area, with which local people are usually familiar. The connectivity should allow for integrated transportation, particularly for those travelling on foot and using small vehicles, and provide convenient access to the town center. Such favorable features would be in accordance with the fine-grained urban fabric structure of the town. In this way, social relationships established through local commerce are maintained and keep the historic town center alive and thriving.

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