

Analysis of the Emergence and Decline of Waterfront Markets in the Nakhonchaisri Basin: Based on Spatial Configuration

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ABSTRACT

 This article has as its objective to explain the emergence and decline of waterfront markets in the Nakornchaisri basin, Nakornpathom Province, Thailand, with a focus on spatial configuration characteristics and spatial centrality using spatial configuration analysis and principles. The analysis incorporates the theories of natural movement, movement economy process, and spatial centrality. The space syntax program was used in the analysis to produce a spatial model map representing transportation route networks of the past and the present for comparison to determine how and why the changes occurred.

The study results reveal that waterfront markets experienced three major periods of the emergence and decline. The first period is the emergence and continuation of the markets (1897-1966). The second is the decline of the markets (1967-1996) and the third is the revival of the markets (1997-present). In addition, it was found that accessibility based on the spatial centrality increased following the change from water to land-based transportation. This resulted in waterfront markets losing their distinctive characteristics as towns expanded. Thus the research has a primary recommendation that water and land transportation routes be integrated in order for the markets to help maintain the value of waterfronts' cultural landscape in the Asian context.

Keywords: *waterfront market, spatial centrality, space syntax, Nakhonchaisri basin*

INTRODUCTION

Like all life, a town or a waterfront market may emerge, thrive for some time, and then come to an end for various reasons. There is a saying that goes "you are where you live" denoting the influence of our

environment upon us. Similarly, it is said that "the townspeople makes the town", and the town's public spaces clearly reflect these ways. Investigation into the factors underlying these beliefs would be beneficial regarding the usage or development of available public space, and should be incorporated

into urban community design concepts as public spaces affect people's everyday activities and function as an active agent in creating identity and providing meaning in a given society (Chairat Charoensin-o-larn, B.E.2549: 172).

Markets are important public spaces in every town. In addition to being a source of food, it is a place for communicating and exchanging information within the community as well as between people and the state. It is a place of entertainment, play, conversation, gathering, visiting, and social interactions for men and women of all ages. A market is thus an 'an area of life', living and thriving as an area of commerce, and serving a variety of functions including supporting the psychological wellbeing of residents (Somrak Chaisingkananon, B.E.2549: 3). In addition, a market is a public space where people spend much of their time engaging in various activities, which makes for a vibrant town with a good atmosphere and quality of life for inhabitants (Jacobs, 1961). New markets can develop, be sustained, and grow or shrink; locations can shift and diversify, potentially developing into a new community of considerable size (Hillier, 2000). A market, being a complicated dynamic system, often gives meaning to the area according to the context and time period, reflecting the identity and the life of the public space.

Markets generally originate in areas with good accessibility, allowing the clustering of diverse activities, especially trade. This is generally supported by a thorough network of both short and long distance transportation routes providing economic advantages (Conzen, 1981). Particularly in the Asian context, waterfront community markets have developed in locations where trade boats came to rest and where rivers, canals and railroads meet. This can be seen in the central region of Thailand where such routes connect the west and the east, meeting in such provinces as Suphanburi, Nakornpathom, Rachaburi, and Petchburi. The waterfront markets in these provinces often share certain important characteristics in terms of location and market components. They are generally located on the banks of rivers and canals. Common components include residents of Chinese ancestry, rows of wooden shop-houses for trade in consumer goods, piers, shrines and temples (Onsiri Panin and Somkid Jiratatsanakul , B.E. 2544). Waterfront markets thus shape the cultural landscape, reflecting human settlement and development based on the area's physical characteristics. The natural environment allows for transportation, trade activity,

and waterfront architecture, and is where people perceive the identity, value, beauty and culture of the locality. The morphology of an area is the factor influencing its suitability for human settlement and location linkages to other areas. However, there tend to be continuous changes going on—big and small, gradual and fast—that make up the historic layers of a cultural landscape (Hattaya Siripattanakul, 2007). Waterfront markets going through the stages of emergence, continuance, decline, and then revival reflect the cycle of transformation of an area.

The Nakornchaisri basin is an agriculturally-abundant area in the lower central plains of Thailand bordering the Chaophraya Basin and the Mae-klong Basin. The Nakornchaisri River is an offshoot of the Thacheen River flowing past Nakornpathom Province. It is 97 kilometers long and covers an area of 1,122 square kilometers. Areas along the Nakornchaisri River where canals, roads and cart tracks meet have seen the development of many waterfront markets. These convenient water and land transportation routes facilitating the markets led to a number of trading communities sprouting up in the area where goods were bought and sold



Figure 1:
The positions of Nakonchaisri Basin in the central region of Thailand

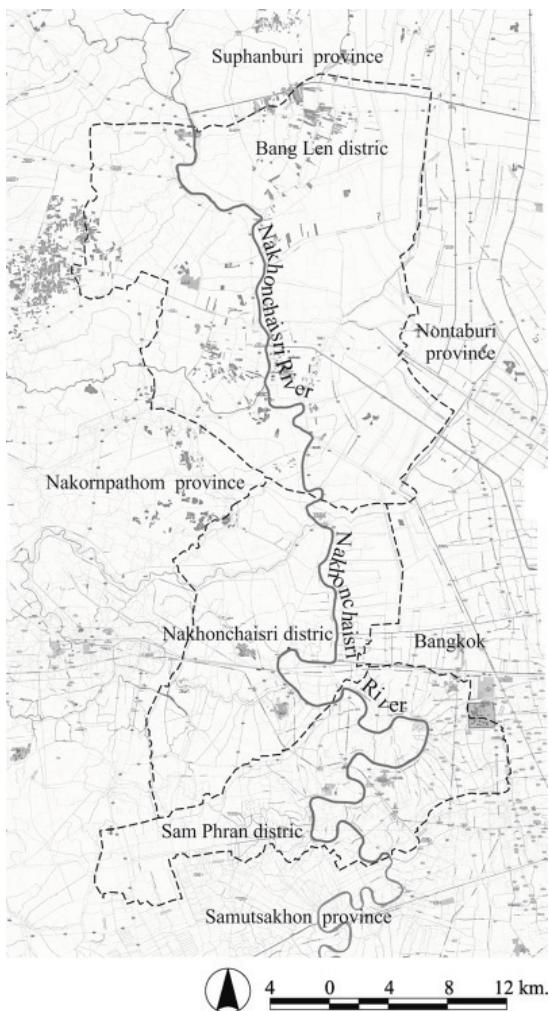


Figure 2:
The positions of Nakhonchaisri River
(devised by the author, 2014)

both on land and from the boats. Markets developed from individual wooden shop-houses to become full-fledged waterfront community markets, where goods were exchanged both within the community and with neighboring communities. They were largely centers for trade in agricultural products and handicrafts produced by local villagers, and also where middlemen came to buy goods to sell further down the river in Bangkok. The expansion of trade and the emergence of these markets were a result of the expansion of rice and sugar trade with foreign countries during the period of 1855-1910. The local production system thus grew to meet external market demand (Saowapa Pornsiripongse et al., B.E. 2551).

In the past, a large number of waterfront markets in the Nakhonchaisri Basin could be found in the three districts of Bang Lane, Nakhonchaisri, and Sam Phran, through which the Nakhonchaisri River passes. The three areas differed in terms of the conditions, water density, and cart tracks connecting to points near and far. The degree of agricultural abundance in the area also affected the emergence and decline of their waterfront markets. As Bang Lane district is far from the estuary, travel and transportation of goods on the main river was convenient and the river is less winding than in the low-lying areas along the southern part of the river. The large volume of traffic due to transportation of both people and goods also contributed to the success of market communities, especially when Suphan Transport Co. Ltd. started boat services around 1942, ferrying passengers and goods from the waterfront markets in Suphanburi province south to the Ngio Rai railway station in Nakhonchaisri district for further travel by rail to Bangkok and Bangkok-noi (Thonburi), Thailand's main rail destination and largest market (Nukul Chompunich, B.E.2537). This



Figure 3:
The environment of Nakhonchaisri River





Figure 4:
Waterfront markets in Nakhonchaisri Basin

was how a large number of waterfront markets emerged and began to thrive, reaching their peak during the reigns of King Rama 5-7. Data shows that Bang Lane district had the largest number of waterfront markets historically, followed by Nakornchaisri and Sam Phran respectively. The

waterfront markets that remain today are generally around one hundred years old and form part of highly valuable cultural landscape.

With the government's focus on developing the land transportation network starting in 1957, roads became more important transportation routes than rivers and canals. Goods transfer points thus shifted from the water front to the sides of roads. This shift naturally led to changes in the transportation routes, trade systems, market cycles, and types of goods traded. The expansion of the industrial sector also led to a deterioration of the Nakornchaisri River and the branching canals, resulting in reduced dependence on the river for food and transportation. The river was then mainly used to support agriculture. Furthermore, road and bridge construction providing thorough access to the basin area allowed the development of a mixture of uses such as residential, farming, and industry. The construction of housing developments, factories, and commercial buildings on the roads around the area, resulted in waterfront markets becoming harder to access and losing much of their vitality. Some closed down while others managed to continue at a subsistence level. Some of these markets were torn down and replaced by modern buildings or otherwise transformed; others have been revived as tourist attractions. These waterfront markets in the Nakornchaisri Basin have thus gone through stages of emergence, transformation, deterioration, and, for some, revival.

This lifecycle of waterfront markets is heavily influenced by the water transportation network giving way to its land counterpart. This shift is a result of changes in the traffic system connection designed to provide favorable access to various areas as a major component in the morphological structure, which can have a major impact of people's lives (Hillier and Hanson, 1984; Jones and Larkham, 1991). Thus it is beneficial to use the theoretical concepts of spatial configuration and space syntax analysis to analyze the factors relating to the emergence and decline of these waterfront markets in the Nakornchaisri Basin by comparing both water and land movement networks of past and present. Accessibility provided by movement networks can be measured and verified systematically both as a whole and individually. Analysis results for each market can also be clearly compared to determine the connections and causes of various changes affecting the markets over time. This article therefore aimed to probe into the following issues: 1) the characteristics of movement networks in the

Nakornchaisri Basin in the past and at present and the contributing factors affecting them, 2) whether the characteristics of the movement networks were related to the emergence and decline of waterfront markets in each period and the underlying reasons for this, and 3) how the changes in spatial configuration affected the waterfront markets. The knowledge gained from this research study could be useful in planning for the conservation, revival, and enhancement of waterfront markets to maintain their vitality and liveliness in appropriate contexts.

THEORIES AND RESEARCH METHODOLOGY

Related theoretical concepts

The probe into the emergence and decline of waterfront markets in the Nakornchaisri Basin was conducted using the concept of spatial configuration analysis, essentially based on the theories of natural movement, movement economy process, and spatial centrality. It can be explained as follows:

The waterfront market areas are naturally based on 'spatial centrality' (Hillier, 2000) resulting from the effective connection of both water and land transportation networks which allow people to both move to the markets and move through the markets to other places. This connection brings about the integration of people in the market area with outsiders, all with different objectives and destinations. The movement networks that are favorable to high levels of traffic density and activities are often the routes that were well-integrated into the town network on the whole, resulting from different levels of 'natural movement' following the nature of the connection (Hillier et al., 1993). This also leads to uneven accessibility, which is reflected in the level of use of certain areas. Some areas are bustling with activity while others are quiet. In turn, activities spread out along particular routes according to the movement economy process (Hillier, 1996). That is, residential areas generally develop along routes with low accessibility while trade activity tends to cluster on routes with higher accessibility, which continuously attracts more trade benefiting from passers-by. The high level of natural movement following the efficient network and the trade activity functions as an attractor of other trade activities, causing a multiplier effect that ultimately results in bustling waterfront markets with higher levels of

trade than other areas. This attracts other activities which spread out into adjacent communities. Such spatial configuration of a market with dynamic centrality is referred to as a 'live center' by Hillier (2000). This process is the major feature of spatial configuration in that it makes it possible for waterfront markets to develop.

It can be concluded that the emergence and decline of community waterfront markets can be explained by the relationships of the three theories mentioned earlier. With this conceptual framework, the tool of space syntax analysis was used to create spatial model maps to consider the characteristics of the movement network and accessibility in addition to spatial centrality. A system of assessing the correlations of each route was also used to consider how the movement network affected the increase and decrease in spatial centrality in each period.

Research Methodology

In the analysis of spatial configuration characteristics and spatial centrality in this research, rivers and canals, roads, railway lines, and cart tracks are the key factors in creating the spatial model. Maps, representing the major periods when changes in spatial configuration occurred that generated changes in the riverfront markets, were also used. The maps are detailed below:

Period 1: 1897-1966 - maps with a ratio of 1:50,000, based on surveys conducted during the period of 1903-1913 (Royal Thai Survey Department), showing land routes, i.e. cart tracks and railway lines, and water routes, i.e. the Nakornchaisri River and the canals and waterways used during that time period.

Period 2: 1967-1996 - Maps with a ratio of 1:50,000, based on surveys conducted during the period of 1968-1975 (Royal Thai Survey Department) showing land routes, i.e. cart tracks and roads, some of which were formerly cart tracks and some which became new roads; and water routes, i.e. the Nakornchaisri River and the canals and waterways; 1992 Highway Department maps.

Period 3: 1997-present - Maps with a ratio of 1:50,000, based on surveys conducted during the period of 1998-2001 (Royal Thai Survey Department) showing land routes, i.e. roads and railway lines; 1992 Highway Department maps. For this period, water routes were not included in the analysis as access to waterfront markets has been mainly via land routes.

The concept of urban morphology (Hillier and Hanson, 1984) is based on the principle that the nature of traffic route connections correlates with the movement of the people in the community or town. The fact that people tend to choose the most direct and the shortest route for travel is reflected in the model's axial line connected as convex spaces where people can meet. In reality, the axial line would be the longest line and the least line representing natural movement of people connecting the whole network, called an axial map or spatial model map of that town area. It was found that a wide or long traffic route would yield a longer axial line than a narrow or winding traffic route.

The spatial model map was processed with the Space Syntax program (Tuner, 2007) to put in order the correlation of accessibility in the whole system of the movement network, using the spectrum of color values, where red to blue and purple represent levels of popularity of the areas and their accessibility. In other words, the areas with highest integration in the urban fabric would appear in the warm tone colors starting with red. Then the colors would concordantly down grade to orange, yellow, green, and blue. Meanwhile, the routes with lowest accessibility or general segregation from the urban fabric would be represented by the cold tone colors of blue, reflecting the tendency to have little movement or low accessibility. Statistical values for the volume of each route were also determined.

Lines of all colors should appear in the analysis of axial maps of a community or a town in general from red to blue to show that the town's movement network is composed of different levels of accessibility, ranging from high to low depending on the characteristics of the network connection, which is an important basis for good spatial configuration. Areas with spatial centrality or markets should feature warm tone color lines to show the movement network in the market area as one with high accessibility and tendency to be a 'live center' according to the concept of the increasing and decreasing spatial centrality of Hillier (2000).

THE EMERGENCE AND DECLINE OF WATERFRONT MARKETS IN THE NAKHON CHAISRI BASIN BASED ON SPATIAL CONFIGURATION ANALYSIS

Period 1: Emergence and presence of waterfront markets (1897-1966)

The geography of the Nakornchaisri Basin during the period of 1897-1966 changed due to the digging of a large number of canals, starting in 1857. The canals opened up cultivation areas and connected rivers and the canals for transportation of agricultural products especially rice and sugarcane to other countries. As a result, trade in the basin grew exponentially. During this period, people often settled along the water transportation routes, and many communities were established where the Nakornchaisri River meets with the mouth of canals. Piers were often built at these points for exchange of goods in the locality. Middlemen also came to buy goods for sale in Bangkok. The waterfront markets thus thrived from trade both within the community and between communities, relying mainly on the water traffic routes combined with land transport and with cart tracks. The markets all had the same function being important centers for the selling and buying of goods, commodities and agricultural products for the communities. In 1903, when rail service from Bangkok-noi (Thonburi) to Petchburi started, people in the basin travelling to Bangkok needed to use passenger boat service to reach the Ngiu Rai railway station. This boat service, formally conducted by Suphanburi Transport Co. Ltd., began carrying goods and passengers along the Thacheen River from Suphanburi province, passing Nakornpatho (the Nakornchaisri River), to Samutsakorn Province in 1942, with their office at Ngiu Rai pier. This addition to the transportation network led to the development of even more waterfront markets.

The study of the morphological structure and spatial centrality of this period reveals that there were 2,721 units in the morphological structure of traffic routes, comprising two types of lines. Mainly the lines were free form, created by the natural flow of the waterways and the long straight lines of dug canals and railways connecting into a loop. The central area of the basin had canals (Klongs) forming a grid of almost right angles between the Nakornchaisri River, Klong Nara Pirom, Klong Mahasawat, Klong Chedi-bucha, continuing to Klong Thawee-wattana and Klong Phasi-charoen. The railway lines also contributed to transportation along the water routes having high natural movement and high accessibility to spatial centrality with a high integration value at 0.3541, represented by clear red lines. There were a large number of waterfront markets in existence at the time including Lam Phaya, Bang Nok Krathung,

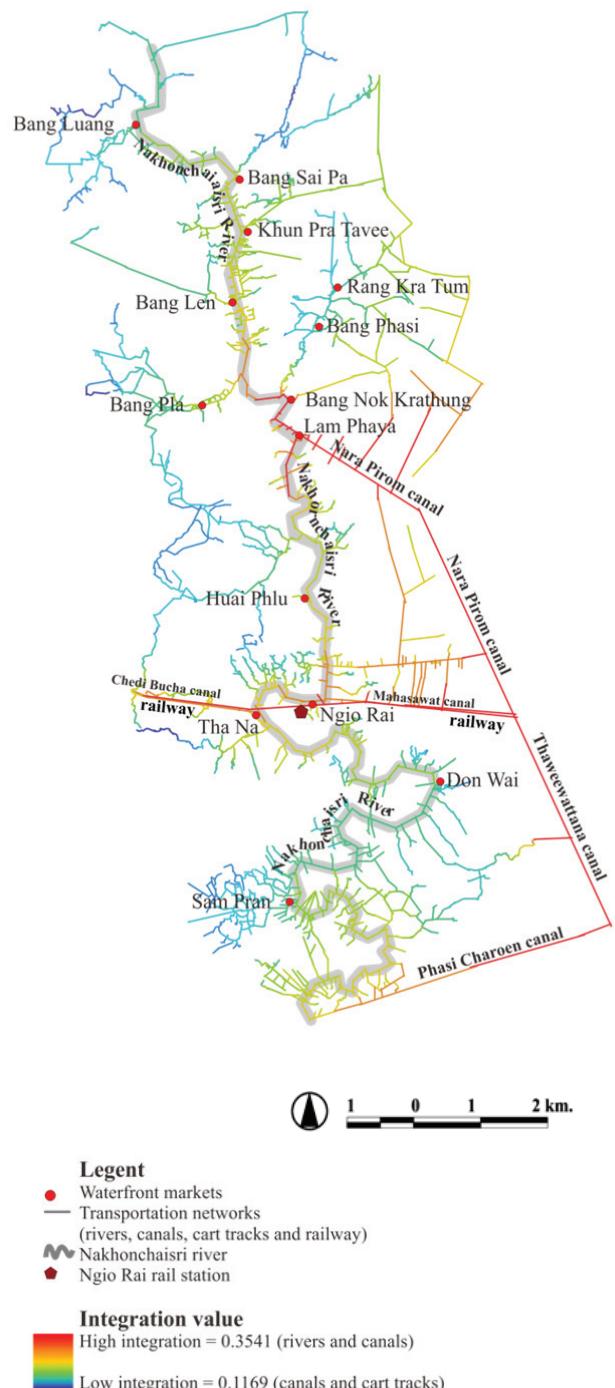


Figure 5:
The spatial model of Nakornchaisri Basin and the spatial centrality in period 1

Bang Pla, Tha Na, and Ngiu Rai markets. This feature also allowed the areas at the mouth of canals to have moderate to rather high accessibility in the orange-yellow positions. The markets that emerged were Bang Sai Pa, Khun PraTawee, Bang Lane, and Huai Phlu markets. There were also some markets at the mouth of the canals but with low accessibility. These included Bang Luang, Rang Kra Tum, Bang Phasi, Don Wai and Sam Pran markets. This was due to lack of continuity with other spaces in the basin network and the configuration of bus and boat routes. The areas with least natural movement were further inland towards the end of the canals and cart tracks, resulting in low accessibility and a low integration value of 0.1169. In the area segregated from the town fabric, shown as light blue and blue lines representing forests, agricultural areas, and low density communities, no waterfront markets emerged.

It is clear that the emergence and the continuation of waterfront markets in the Nakornchaisri Basin during this period are related to the morphological structure of the movement network. The positions with high natural movement or high accessibility to spatial centrality saw waterfront markets originate earlier and were more clustered than those areas with less natural movement. The movement networks with a greater circulation of people helped other areas with lower accessibility also see more waterfront markets emerge. In particular, in 1942, the largest number of waterfront markets were opened and thrived for decades within the water spatial centrality network.

Period 2: Decline of waterfront markets (1967-1996)

During the first period, people still regularly settled along the rivers and canals. Many communities grew and land use also expanded for agriculture and development due to government policies, especially those relating to transportation network development. In 1962, more roads and bridges were built, making it more convenient and faster to travel by land. People started travelling by car, thus roads assumed a larger role in transportation than rivers and canals. Goods transfer points changed from the waterfronts to road sides, directly affecting waterfront markets and people's lives in the market areas. Trade patterns, certain types of goods, water travel-related occupations and goods transportation by water started to fade and disappear. People moved out from the market areas

or accessed markets more by land routes. In 1967, the boat service business finally closed down. At the same time, people were settling along the roads, resulting in commercial areas emerging beside the roads adjacent to the waterfront markets. These commercial areas expanded quickly. Later in 1984, Pinklao-Nakhonchaisri Road was constructed to intersect with Petchkasem Road to allow through-travel from Nakornpathom to Bangkok by car without having to change to boat or rail. Then there was also construction of Phutthamonthon 4,5,6,7 roads to join up with Pinklao-Nakhonchaisri Road as well as the country roads that thoroughly connected waterfront communities and waterfront markets. Land use became more varied and included industrial factories which dumped their waste water into the rivers and canals. As people relied less on the waterways for food and transportation, the rivers and canals became mainly used to support agriculture. Waterfront markets could not withstand these external pressures and many became so inactive that they had to adjust by becoming small community markets or permanently closing down, as many did around 1987.

The study of the morphological structure and spatial centrality of the movement network during this period reveals that there were 3,628 units in the morphological structure of traffic routes, comprising two types of lines. The main lines were free form, created by the natural flow of the waterways and the long straight lines representing railway lines, existing dug canals, and a large number of newly built roads spreading throughout the basin. Some roads paralleled the canals; others crossed or connected to the canals. The central to the lower parts of the basin in Nakornchaisri and Sam Phran districts were dense with the thorough road network that covered the whole area. This increased the accessibility to water spatial centrality to a higher level than in the previous period, with a high integration value of 0.5924 at Klong Mahasawat, and land accessibility being at a similar level of 0.5931 on Phetkasem Road. These are shown as red lines, suggesting that people opted for land transport more. During this time, the waterfront markets of Talad Mai, Sam Phran, Donwai, and Ngiu Rai became more inactive and started to close down. In fact, Bang Nokkratung Market was completely dismantled in 1957. Meanwhile, waterfront markets at the upper part of the basin were also affected, shown as the light blue-blue lines with the lowest accessibility level of 0.1196 in the areas near Bang Luang market, which featured segregation from the urban fabric. In addition, comparing the morphological structure

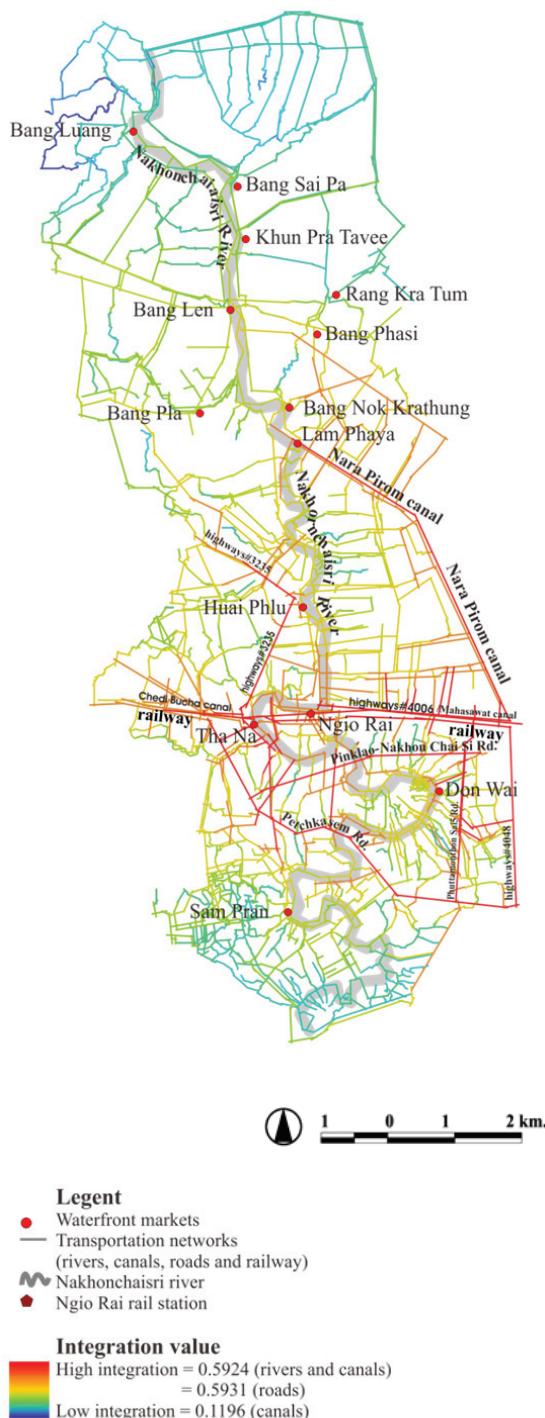


Figure 6 :
The spatial model of Nakhonchaisri Basin and the spatial centrality in period 2

of the waterways in this period, it was also found that some canals were not represented by lines due to them being filled in to make way for road construction.

It is clear that the closing of waterfront markets of the Nakhonchaisri Basin in this period took several forms, including becoming increasingly inactive and reduced to small community trade outposts, closing permanently, being used for residential purposes only or being completely demolished. All this was the result of the changes in the morphological structure of the shift in the movement network from water to land, causing the natural movement or accessibility to spatial centrality by water to take a lesser role than accessibility by road. In particular, market areas became inner areas that were harder to access from roads, leading to less people traveling to and from them. The areas along the roads, on the other hand, saw more natural movement as the spatial centrality network on land expanded during this period.

Period 3: Revival of waterfront markets (1997-present)

After facing a down period lasting several decades, several waterfront markets have now been revived in a new context. They have shifted from just providing services for people in and around the community to focusing on tourism-related trade with promotion and support from government and local agencies aiming at cultural tourism. Redevelopment policies centered on increasing community commerce under local care were established. The success of such efforts happened in large part due to the participation by local people and communities that wanted to see the revival of the markets, which would bring income from trade and tourism activities. Many markets started promoting themselves via various media with the cooperation from local government agencies, temples, and schools. Revival of markets during this period were due to the addition of daily tours, holiday tours and festivals, as well as increased trade within the community, and the production and sale of well-known local food products, souvenirs, and craft items. Many of the waterfront markets that had been established as centers of trading of goods, commodities, and agricultural products in various communities and later declined have been revived and now serve as tourist attractions.

The study of the morphological structure and spatial centrality of the movement network of this

period reveals that there were 16,873 units in the morphological structure of traffic routes, comprising two types of lines. The main lines were the straight lines of major roads, railway lines, and the roads along the dug canals; the free form lines were the road network leading to housing development communities. Some of the roads were short and with dead ends, forking from the main road and stopping at the river bank. Road networks spread throughout the basin especially to the central to the lower areas, forming an almost right angle grid between Pinklao-Nakornchaisri (Baromrajchonnee) Road, Phetkasem Road, Puttamonthon 4,5,6,7 roads, Highway # 4006, Highway # 3235, and the railway lines. As a result, the level of natural movement on land or accessibility to land spatial centrality was higher than that in other areas at 0.6373. Red-orange lines clearly indicate that the waterfront markets in this area, Tana and Huay-phlu markets, are recovering. Meanwhile, in the areas with moderate to low accessibility where the lines were yellow-green, community retail business went on in Lamphaya Market and Bangluang Market, which also opened as a tourist attraction, but only on holidays. In this way, there was some traffic with a moderate level of natural movement due to the location being far from the main road from Bangkok to the northern part of the basin. It was also found that the markets of Bang Lane, Bang Sai Pa, Sam Phran, and Bangpasee recovered to a certain extent as community trade areas. Meanwhile, those areas with low accessibility or a segregation level of 0.1518, shown as light blue-blue lines at the lower part of the basin and the central part along the Nakornchaisri River, had quite low natural movement. Bangpla Market was found to be mainly used for residential purposes. On the other hand, even if an area's accessibility was found to be low, if the area was connected to high potential routes, it could also lead to higher natural movement as in the case of Donwai Market. However, for Ngiu Rai Market, while in a position of high accessibility to spatial centrality, recovery was less than impressive. The market functioned only as a community trade area as it was in a location served mainly by rivers and railway lines, which were used less frequently than roads. The Ngiu Rai Market thus could not be revived as a trading center to its fullest potential.

Almost all waterfront markets experienced some level of revival during this period based on accessibility to spatial centrality by land to the markets. Those areas with more natural movement than others would have an advantage in that they could better operate as tourist attractions. Those with less accessibility would need more attractions to entice people

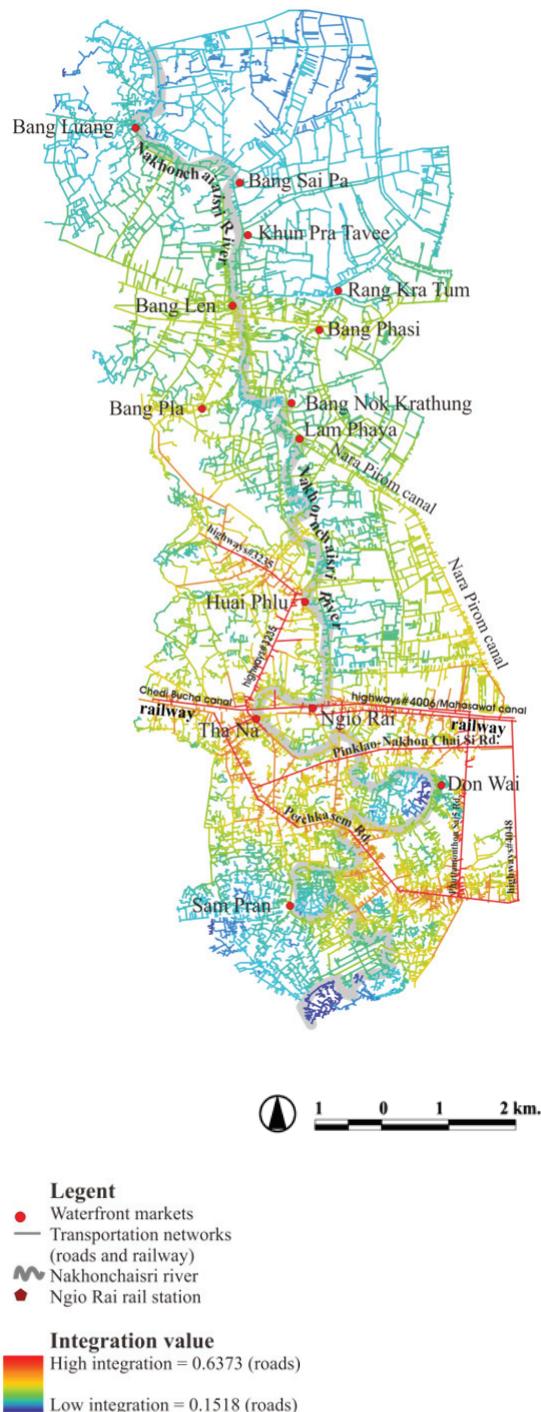


Figure 7:
The spatial model of Nakornchaisri Basin and the spatial centrality in period 3

to travel to the area as well as enhance natural movement so that the waterfront markets could integrate with the land spatial centrality network.

CONCLUSION AND RECOMMENDATIONS

The study of the morphological structure and spatial centrality can explain the emergence of waterfront community markets in the Nakornchaisri Basin as being due to the thorough and effective development of the water transportation network in the area, leading to different levels of natural movement. Those areas with higher natural movement featuring higher accessibility and convenience for travel to other places both near and far, as well as being in a high visibility location, gained favorable advantages in developing waterfront markets and bustling communities with water spatial centrality in the first period (1897 – 1966).

All of the waterfront markets studied experienced a period of decline in the second period (1967-1996) related to the changes in their morphological structure as the water traffic shifted towards land transport. Natural water movement followed suit. Although visibility and access to spatial centrality via water were higher than in the first period, the potential of land routes was higher. Therefore, natural water movement would be less efficient or less preferred. After that period, some waterfront markets were able to recover in the third period (1997-present). This recovery was partly due to land transport allowing better access to spatial centrality (as shown in Table 1). As a result, some markets took on an economic role as tourist attractions. However, it is possible that the recovery or rebirth of some markets was due to other factors such as the surrounding environment, the types of goods available, atmosphere, etc. These factors could attract the natural movement of people from the

outside into the area despite it not being located in an area with high visibility and accessibility. It is possible that this revival however may only last for a short period of time or be felt intermittently. Some markets were not strong enough to resist changes and thus become sluggish or their trading role terminated permanently. Therefore, it can be seen that the condition of waterfront markets can change dynamically and it is important that social, economic and cultural factors be studied further to determine the underlining causes of the emergence and decline of these waterfront markets.

The research results also show the effects of increasing access to spatial centrality following the change from water to land transportation. It can be seen that in Period 3, the number of units in the morphological structure that were land routes was four times higher than that in Period 2 and six times that in Period 1. This indicates that land traffic routes had spread throughout the basin area. Now that the waterfront markets can be conveniently accessed from the roads, it is likely that the faster and more convenient it is to reach these markets, the faster their unique components may be lost, be it architectural characteristics of local buildings, indigenous people, piers, or agricultural goods produced in the community, all of which help shaped the identity of these markets.

It can be concluded that in the process of emergence and decline of waterfront markets during each period, the markets assumed certain economic roles that varied with the times. Several that remain are still public spaces for townspeople. They are spaces for commerce, for holding functions, and for relaxation for all walks of life. As the Thai saying goes, “Markets are places to sustain life”. Such a statement could be properly applied to “waterfront markets”, Thai-style public spaces in the Asian context. They can bring to the community or town either liveliness or isolation, reflecting the character of the town itself and the happenings of the people

Table 1: Summary of accessibility of spatial centrality of waterfront markets during the three time periods

| Period | Number of the morphological structure | High integration/ Type of transportation pattern | Low integration/ Type of transportation pattern |
|----------|---------------------------------------|---|--|
| Period 1 | 2,723 units | 0.3541/ river, canals, cart track | 0.1169/ river, canals, cart tracks |
| Period 2 | 3,628 units | 0.5924/ river, canals 0.5931/ roads | 0.1196/ river, canals 0.4496/ roads |
| Period 3 | 16,873 units | 0.6373/ roads | 0.1518/ road |

during those time periods. They also demonstrate the community's resilience following the changes in the spatial configuration and the relevant contexts.

To maintain the value of the cultural landscape reflected in the settlement and social development of waterfront market communities and their trade, it is necessary that water and land transportation systems be integrated. This should add to the visibility, accessibility, and dynamic centrality of waterfront markets, aided by both land and water natural movement according to the principles relating to the emergence and decline of spatial centrality. In this way, the river will continue to be an integral part of the town fabric of these market communities, and of the daily life of people in the Nakornchaisri Basin as it was in the past.

ACKNOWLEDGMENTS

This article is a part of a research entitled, 'Spatial Transformation of Waterfront Communities Market in Nakhon Chaisri River Plain, Nakhon Pathom Province'. The author would like to thank Rajamongala University of Technology Rattanakosin, for providing research funding.

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