Pertanika J. Soc. Sci. & Hum. 32 (2): 409 - 435 (2024)

PERTANIKA JOURNALS

SOCIAL SCIENCES & HUMANITIES

Journal homepage: http://www.pertanika.upm.edu.my/

Post-COVID-19 Spatial Resilience in Community-based Tourism: A Case Study on Ayutthaya

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ABSTRACT

There are challenges to community-based tourism (CBT) post-COVID-19, and some health measures still need to be taken to prevent the risk of people spreading the disease and remaining safe from infection. It is especially important for those in rural areas, who may have limited access to healthcare and other resources, and certain health measures can be taken to protect themselves and others. Nineteen tourism community cases from rural Ayutthaya were selected for study since their CBT recovered faster from the pandemic than in other provinces. Data were recorded and collected on the physical and actual conditions of the properties surveyed. Principal component analysis was then implemented to the dataset to clarify the major spatial management attributes contributing to decisions on the operation of the tourism community during a crisis. The study results revealed that multi-center tourism communities with several activity bases were more able to fully operate and quickly return to tourism. This pattern of community spatiality is a key factor in promoting resilience in the tourism community during and after the pandemic. The findings are expected to benefit the development of post-COVID-19 community tourism to suggest appropriate approaches for managing a geospatial tourism community.

Keywords: Carrying capacity, impact, post-COVID-19, rapid survey, resilient, spatiality, tourism community

ARTICLE INFO

Article history:
Received: 12 June 2023
Accepted: 01 January 2024
Published: 10 June 2024

DOI: https://doi.org/10.47836/pjssh.32.2.04

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INTRODUCTION

From approximately the 1970s to the 2010s, the tourism sector in Thailand has been one of the largest economic contributors to the country's GDP, fluctuating by 21.9% in 2019. However, due to the impact of the COVID-19 pandemic, a significant loss in tourism revenue has been experienced, with

ISSN: 0128-7702
e-ISSN: 2231-8534

the sector's share of GDP decreasing to 12% in 2020. The Government of Thailand continues its campaign to reopen tourism activities (Worrachaddejchai, 2021). The number of tourists in the first quarter of 2022 was 1,016,103, more than 2,368% higher than in 2021. By the end of 2022, at least 5,000,000 inbound tourists will visit the country (Ministry of Tourism and Sports, 2022).

The challenges faced post-COVID-19 go far beyond mass tourism. The community-based tourism (CBT) model is an important tool for transforming the crisis into an opportunity by allowing tourists to experience the local resources of each location ("Creative tourism," 2020). The government has posited that CBT will be a flagship model in the recovery of the country's tourism industry going forward. Therefore, raising awareness of natural and cultural heritage is important for attracting premium tourists (Ellis & Sheridan, 2014; Giampiccoli & Mtapuri, 2015; Jugmohan et al., 2016; Lindström & Larson, 2016), with communities also benefiting. The new behavioral changes in the mobilization patterns of tourists mean they are more likely to travel by car than public transportation, making destinations in and around Bangkok more accessible. For example, Ayutthaya recovered much faster than other provinces (Prajongkarn et al., 2020). As a result, the tourism community in Ayutthaya has been selected as a case study on the development of community tourism post-COVID-19 to investigate how local people manage their geospatial tourism capability.

In consideration of the significant disruption caused by the COVID-19 pandemic to Thailand's tourism sector, an urgent need emerges to explore innovative strategies for post-pandemic recovery. Beyond the immediate challenges of restoring tourist numbers, there lies a unique opportunity to redefine the future of tourism in Thailand through a sustainable and community-focused lens. This research embarks on a critical journey to investigate the role of CBT in the country's tourism resurgence. Since the Thai Government positions CBT as a flagship model for revitalizing the industry, understanding how local communities harness their geospatial tourism capabilities becomes pivotal. By exploring the spatial adaptability of these communities and their relationship with tourism activities, this study seeks to enrich the understanding of spatial management in CBT. It aims to create a valuable database for informed decision-making at the operational level. The implications of this research extend far beyond Ayutthaya; they hold the potential to shape a more resilient, community-driven, and sustainable future for tourism in Thailand and serve as a beacon of hope for post-pandemic recovery in similar contexts worldwide.

This research extends beyond prior studies in the field and offers fresh insights into the post-COVID-19 recovery strategies of CBT. It delves into uncharted territories, examining how the spatial dynamics within tourism communities can drive resilience and sustainability. It also contributes to the existing literature by bridging the gap

between spatial management and CBT in the context of a pandemic or other health crises. It offers a novel perspective that emphasizes the importance of space availability and spatial adaptability, shedding new light on how these factors can influence the resilience of tourism communities.

Case Study Description

The tourism sector in Thailand has been one of the largest industries in the past few decades. The development of tourism products and services has grown rapidly and spread throughout the country. CBT has, therefore, increased significantly under the support of the Designated Areas for Sustainable Tourism Administration (DASTA) and Community Development Department (CDD), Ministry of Interior. A survey conducted by the CDD in 2018 revealed that 3,273 communities across the country operated tourism-oriented products and services (Community Development Department, 2018). Of these, 19 tourism communities operate in Ayutthaya. These communities are usually relatively small and settle in waterfront agricultural areas outside the historic city core. In addition, it is possible to travel to Ayutthaya by several modes of transportation. Besides, Ayutthaya is a perfect destination for cultural tourism in Thailand, according to a report on the Ayutthaya Historical Park, an important UNESCO World Heritage site (Ratanapongtra & Techakana, 2019). As a tourist destination, the province welcomed 7.6 million visitors (95.94% of whom were domestic tourists) in 2022, increasing by 227.85% for the same period in 2021 (Ministry of Tourism and Sports, 2023). According to the data, Ayutthaya demonstrated a significant recovery following lifting COVID-19 restrictions on July 1, 2022.

In the present day, external factors play an important role in spatial management, especially the changes occurring post-COVID-19, which have affected tourism patterns. These have affected local tourism and the mentality of community members who feel unsafe about their health and livelihoods. The lack of tourism opportunities has made their futures uncertain as they await government support and post-COVID-19 economic recovery (Pratomlek, 2020). Many communities may lack preparedness for spatial resiliency, understanding of their design, and the utilization of buildings and supporting facilities for good hygiene, as well as mechanisms for the distribution of tourists. It is important to understand the carrying capacity necessary for creating spatial resilience in the built environment of the tourism community to help communities manage their areas appropriately for post-COVID-19 tourism.

LITERATURE REVIEW

The literature and theoretical background relating to spatiality in the tourism community during COVID-19 could involve discussing concepts such as place and spatiality, COVID-19 in local communities, and its impact on geospatial communities. These concepts are relevant to understanding how tourists and residents perceive and

connect with the physical environment of a tourism community. In the tourism community context, understanding the spatiality of tourism activities and the interactions between tourists and residents is crucial for sustainable tourism development. It includes considerations such as the distribution of tourism activities across space, the impacts of tourism on local infrastructure and natural resources, and tourism's role in shaping a community's social and cultural fabric. By taking a spatial perspective on tourism, it is possible to identify opportunities for enhancing the benefits of tourism while minimizing its negative impacts, especially since changes taking place after the COVID-19 pandemic are bound to affect tourism patterns. The tourism community needs to adapt to the new reality of the pandemic and ensure the safety of tourists and the communities they visit while promoting sustainable tourism practices, benefiting local communities in the long term.

While there have been many studies on the overall impact of COVID-19 on the tourism sector at the macro level, some of the key issues that have emerged include changes in travel behavior (Anwari et al., 2021; Gao et al., 2021; Kang et al., 2022), the shift toward domestic tourism (Chan, 2022; Kupi & Szemerédi, 2021; Tan et al., 2022), and the need to manage tourism flows and capacity (Lamers & Student, 2021; Lim et al., 2022) to ensure social distancing and public health measures are followed. There is still a need for more research at the local community level, particularly on how COVID-19 has impacted CBT and the specific challenges local communities face. At the local level, there has been growing recognition of the need to involve communities in tourism management, particularly in CBT. It includes issues relating to the management of spatiality to support a new normal and adapting to new demands in a post-COVID-19 world.

Spatial Management within the Context of CBT

In the dynamic world of tourism, where travelers seek immersive experiences and communities aim to harness economic opportunities without compromising their tourism resources and health care, spatial management emerges as a linchpin. It is the cornerstone upon which the delicate balance between tourism benefits and potential drawbacks in CBT hinges (Afenyo-Agbe & Mensah, 2022). This physical aspect is one of the primary elements of CBT. It may include the beauty, atmosphere, and uniqueness of sites, the waste disposal management system, tourism activities, and sustainable system management (Sitikarn et al., 2022). Geographically, spatial management encompasses all the natural and human-made features found within precisely outlined limits, conceptualized as the scope within the realm of human tangible and intangible symbols manifests, and its physical dimensions are delineated by both physical elements and human imagination, as articulated (Świąder, 2018). This approach represents a strategic framework where architectural and urban designs are

aesthetically pleasing, environmentally responsible, and conducive to the well-being of residents and users. It involves the thoughtful allocation of space for residential, commercial, recreational, and green areas, as well as the integration of sustainable practices to mitigate environmental impacts.

Spatial management strategies in the tourism sector encompass a range of practices that extend beyond conservation and safety considerations. They also have implications for visitors' and local communities' well-being and healthcare (Ibănescu et al., 2018). For instance, apart from visitor flow control at heritage sites, providing accessible rest areas and amenities contributes to visitor comfort and well-being. Sustainable tourism development in Bhaktapur City (Nepal), focusing on the economic and social dimensions of the tourism sector, is pivotal in preserving the delicate balance between tourism growth and the well-being of residents. It also enhances spatial management practices in this renowned central tourism hub and develops its infrastructure (Badal, 2020). Besides, the significance lies in establishing host community involvement in tourism planning in Girona, Spain, alongside insights into pre-, during, and post-COVID-19 tourism data. It underscores the crucial role of spatial management, seeking to create a diversified and controlled tourism offer, ensuring that the city's attractions are optimally organized within a defined spatial framework. This approach aims to empower tourism workers and enhance the overall visitor experience while safeguarding the residents' quality of life (Fernandez et al., 2022). These examples underscore the multifaceted role of spatial management in promoting sustainable tourism by safeguarding natural and cultural assets, ensuring safety, enhancing well-being, and facilitating healthcare access for all stakeholders.

Spatiality in CBT

Spatial characteristics in the context of CBT relate to how the physical space of a community is used to support and promote tourism (Pratomlek, 2020; Sunakorn & Pinijvarasin, 2007). These may include using natural and cultural resources, such as parks, trails, and historical landmarks, as well as developing infrastructures, such as accommodation, transportation, and visitor centers, to support tourism in the community. The idea is to use tourism to preserve and promote the unique character of a community while also generating economic and social benefits for the residents. In the context of spatiality in tourism, this study classifies a tourism destination into two categories: (1) the main tourist destination and (2) related areas.

The main tourist destinations are those most tourists want to visit, such as ancient monuments, old towns, historical landmarks, traditional houses, cultural areas, and local community landscapes. Some of these may be cultural, natural settings designed or managed by the local community, such as community-based organizations. Tourist destinations should include three main aspects: space, system, and social network (Werapol & Prachet, 2004), where space

is the major component, with a spatial border connecting it to other areas. Boullon (2004) states that space consists of zones, areas, centers, complexes, units, nuclei, clusters, and tourist corridors. Thus, space and tourists are important players in understanding the relationship between a destination and its areas of service (Anwari et al., 2021). The main tourist destination in CBT is the hub of community tourism and a central gathering space for visitor orientation and information.

Related areas are tourist destinations that support the main tourism activities and tend to be adjacent, related, and connected to the main tourist destination, such as a learning space, rest area, space for facilities or services, and many others, including those interpreted as historical urban landscapes. These physical characteristics usually include providing quality services and accommodating a sufficient number of tourists, with any activities accessible to all (Gao et al., 2021). Related areas also help to promote the authenticity and imagery of the community (Kang et al., 2022), as well as the value of the area, while stimulating the community economy.

An association between the main tourist destination and the related areas within the territorial boundaries of a tourism community can be categorized into two distinct operational management approaches: single cluster and multi-center (Figure 1). In the single cluster approach, the main tourist destination serves as the sole focal point for tourism activities within the community. The centralized model concentrates resources, infrastructure, and services in a single location, allowing for easier management and coordination. The main tourist destination is the primary hub, attracting visitors and providing a wide range of tourism facilities and services. For instance, in the small Hakka village of Lai Chi Wo in Hong Kong, UNESCO Global Geopark, the Lai Chi Wo Cultural hub, surrounded by a traditional Hakka settlement and lush countryside, plays the role of the sole tourism hub. Visitors can find a concentration of heritage sites, museums, and visitor services, making it a centralized and easily managed tourist center. In contrast, the multi-center approach involves establishing multiple centers or nodes across the tourism community. These centers are strategically distributed, offering unique attractions, amenities, and activities. In the case of the Shirakawa-go and Gokayama World Heritage Site in Japan, there are three major villages: Shirakawa-go Ogimachi, Gokayama Suganuma, and Ainokura. These strategically positioned centers offer distinct cultural and architectural experiences, distributing tourism-related activities across the region and enhancing the overall visitor experience.

However, COVID-19 required communities to strictly adhere to preventive measures in private and public settings. These measures had a disproportionate spatial impact on vulnerable communities. With densely populated districts at greater risk of COVID-19 transmission (Chan, 2022), tourism communities were severely affected. Despite the restrictions being

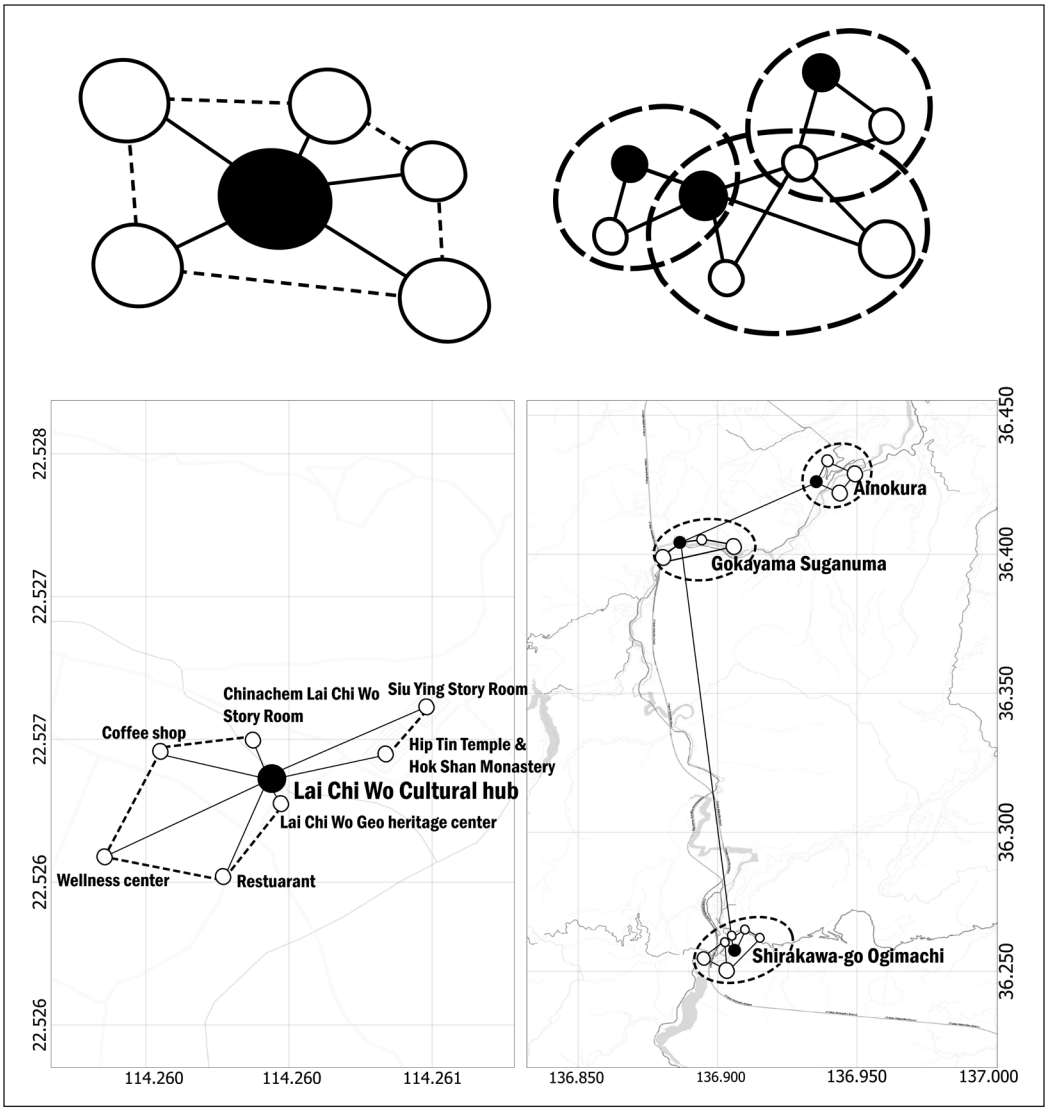

Figure 1. The comparative model shows (left) the single cluster approach of Lai Chi Wo in Hong Kong and (right) the multi-center tourism of Shirakawa-go and the Gokayama in Japan
Source: Author's work

lifted in Thailand in July 2022 and a return to normal life, the risk of COVID-19 is still of concern, particularly in tourism communities, where older adults in rural areas face unique risks (Kupi & Szemerédi, 2021). It is, therefore, necessary to consider the relationship between tourism and well-being. However, some research reports indicate that this relationship is not a primary factor but also includes activities, health care, public spaces, and sanitation (Cheer, 2020; Hall et al., 2020; Lamers & Student, 2021; Lim et al., 2022; Persson-Fischer & Liu, 2021).

COVID-19 in Local Communities

Older adults are vulnerable to the negative impact of COVID-19, being at greater risk of infection and mortality (Promislow, 2020; Shahid et al., 2020). They often faced tighter restrictions during the pandemic, such as being unable to go out, visit friends, or participate in social activities, which negatively affected their social relationships (Kimura et al., 2020). Other future mental health issues and social aspects of older adults should also be considered post-COVID-19, as well as the direct health problems arising from COVID-19 itself. The likelihood of social isolation and loneliness among the older population has markedly increased with the COVID-19 pandemic, along with related public health measures, potentially leading to depression, anxiety, and cognitive impairment (Gorenko et al., 2021). Physical activity, which has various health benefits, such as preventing cognitive decline, falls, and cardiovascular disease, decreased significantly during the pandemic. The prevalence of older Thai adults with adequate physical activity decreased to 53.3% from 73.4% in the first year of the pandemic. After two years of the pandemic, only 5.3% more older adults were able to return to their standard physical activity level, fewer than other age groups (Research and Development Group, 2022). The financial impact of the pandemic remains a major issue post-COVID-19, with the percentage of older Thai adults earning sufficient income decreasing from 54% to 37% during the pandemic (United Nations Population Fund, 2020).

According to a previous study, older Thai adults in rural and semi-rural areas needed support with old-age allowance distribution, disease prevention equipment, an information center on COVID-19 in the community, and channels to express their negative feelings such as fear, stress, loneliness, or depression (Waelveerakup, 2022). People in rural areas received information from community networks of village health volunteers during COVID-19 but could not access the latest news from media sources such as the Internet (Vicerra, 2021). Thus, community networks need to be maintained, and access to new information or healthcare through technology should be encouraged in rural areas. A previous study exploring the resilience of rural older adults in Canada during COVID-19 found that their competencies depend on the material, physical, and social environment (Herron et al., 2022). Older adults were able to cope with the situation by keeping themselves busy, reaching out, and maintaining a positive outlook (Fuller & Huseth-Zosel, 2021). An environment that offers opportunities, such as access to outdoor spaces, is important for making meaningful connections.

Impact of COVID-19 on Geospatial Communities

The spread of COVID-19 affected many industries, with the tourism industry being one of the most affected and likely to be among the last to recover. Consequently, the pattern of new tourism will never be the same again. Tourism consumers and providers have also changed and are

sometimes forced to do so. Over the three years of the pandemic, people have gradually adopted new practices into their daily lives. These changes have been immense, even when everything has returned to normal or the new normal (Tangirala, 2020). Although Thailand's tourism slowly recovered in 2022, health measures still need to be strictly implemented. Zukhri and Rosalina (2020) proposed two phases for tourism recovery, the first of which focuses on domestic tourists under the implementation of sanitation and hygiene measures. When the area is in a stable condition, and the incidence of death has declined significantly, a stimulus model using information technology can complement sanitation and hygiene measures and present a tourism model for developing a sustainable relationship between humans and the environment. It will optimize the existing tourism system and make it more profitable, stable, resilient, and sustainable.

The impact of COVID-19 on public spaces could provide a good opportunity to examine the linkage between the planning of public spaces and well-being (Honey-Rosés et al., 2021). The future of space management depends on the value placed on public spaces by decision-makers for socializing, community building, and identity creation. The COVID-19 pandemic demonstrated that the design of public spaces for protecting and promoting health needs to be reviewed. It requires the design and management of architecture and public health to be integrated by considering the mechanism of disease transmission. In addition, the activities of each place should be designed in a health-appropriate and space-efficient way (Association of Siamese Architects under Royal Patronage, 2020). Architectural design and management have a spatial effect on social or physical distancing to reduce the spread of infection. These practices inevitably affect the use of space.

METHODS

This research explores the post-COVID-19 spatial management of tourism communities in Ayutthaya province as a case study. The results inform follow-up qualitative data collection and analysis of the quantitative analysis. Data collection at the cluster level was conducted using a rapid survey to obtain a general overview and ascertain the broad relationships between health, well-being, and carrying capacity changes from January 2022 to November 2022 (during the fourth phase for easing nationwide restrictions and after Thailand's nationwide COVID-19 restrictions) through interviewing and recording data from CBT providers. A rapid survey is suitable for documenting the distribution and type of subjects across sizeable regions and medium to large-scale projects (Oppermann et al., 2021). The rapid survey method was chosen for its ability to provide timely, resource-efficient, and comprehensive insights into the post-COVID-19 tourism landscape in Ayutthaya. It allowed the researcher to gather data from diverse stakeholders and swiftly adapt to the dynamic conditions of the study area, making it the most suitable method for addressing the research questions effectively.

Data collection was carried out in all 19 tourism communities in Ayutthaya province that were still in operation during the COVID-19 era (Figure 2). This study's sampling process involved selecting the entire population due to its small size. This research aims to capture a detailed and accurate representation of the tourism communities by including the entire population, ensuring no perspective or experience was overlooked. This survey was conducted on the communities' physical characteristics and ability to accommodate tourists. It recorded the physical conditions, collected query data from the actual conditions and validated the properties (Yodsurang et al., 2022). The variables used in the survey are explicitly detailed in accordance with the guidelines provided in the "Variables for Defining the Spatial Impact of Tourism in CBT." The derived data from the rapid survey were then discussed among CBT providers and local authorities.

Quantitative data collection involved an empirical presentation *in situ* to assess the condition of spatial tourism resiliency after lifting COVID-19 restrictions using the evidence-based physical characteristics of the selected location. The data were then analyzed and integrated to answer the related aspects of the research question. Survey data

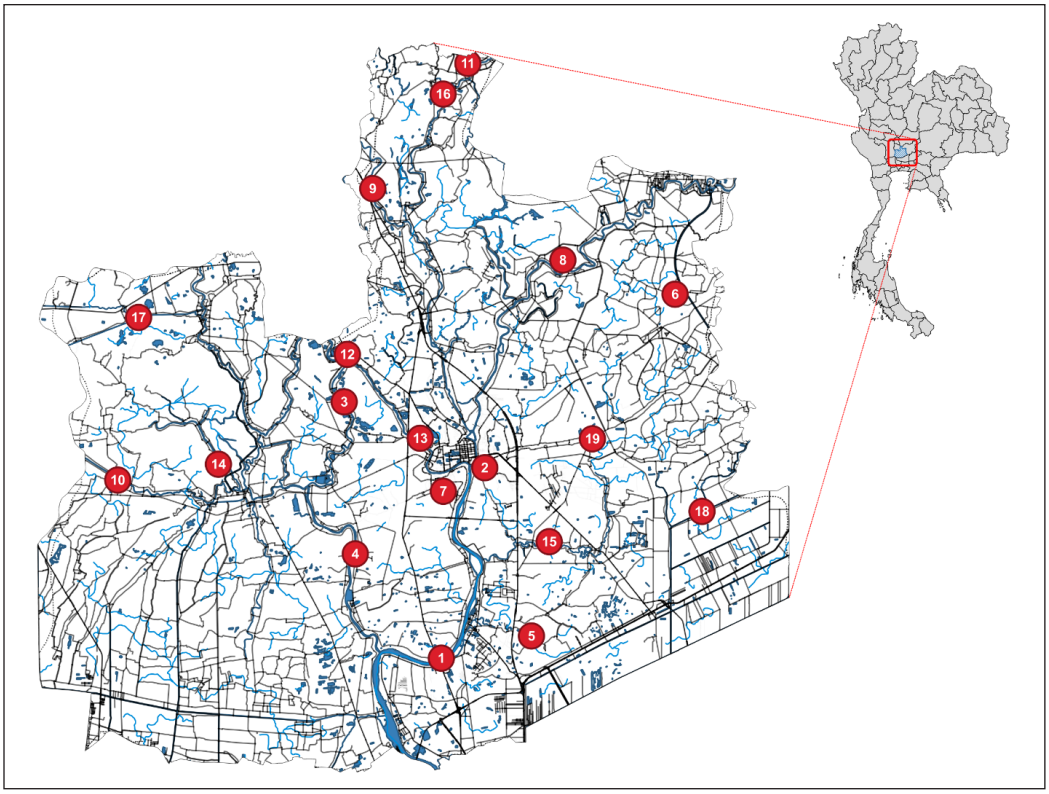

Figure 2. Distribution of the tourism communities under study in Ayutthaya
Source: Author's work

comprised a series of information variations, and the responses were then analyzed using Principal Component Analysis (PCA) to interpret the surveyed data.

Variables for Defining the Spatial Impact of Tourism in CBT

The spatial impact of tourism on CBT indicators (Table 1) was assessed based on the number of visitors, activities, and facilities provided. These indicators were adapted from previous studies identified in the literature review. These properties were the main resources for decision-making in the tourism community, providing tourist attraction activities, and maintaining public health in the area. The criteria used to decide on space for gathering may differ. Any decision should be supported by evaluating the risks, potential management, and event planning degree (World Health Organization, 2020). The airborne transmission of COVID-19 is widely recognized, and most architectural and spacing design solutions come within the six-foot rule (Elskalakany et al., 2022). When applying the six feet rule in CBT gathering spaces, it is important to consider the spatial information and design of the space, including the number and placement of chairs, tables, and other furniture, as well as the flow and movement of visitors and staff.

Gathering spaces may need to be re-designed to allow plenty of space between visitors to maintain the recommended distance of at least six feet. It could

Table 1
Spatial impact of tourism on CBT indicators

Major indicators	Category
Targeted visitors (comparing pre- and post-COVID-19)	**Individual visitors:** Usually walk-in visitors who arrive at a community without making a prior reservation or arrangement.
	Small group visitors: Those interested in visiting a community together. The group size is usually limited to around ten people.
	Group excursion: Larger groups of visitors interested in visiting a community as part of a pre-organized tour or excursion.
	Event-led visitors: Those interested in attending a specific community event, such as a local festival, cultural performance, or workshop.
Main activities	**Homestay:** Visitors staying in a local family's home, allowing them to experience the local culture and way of life, providing an intimate and authentic experience of the local culture, as well as a unique opportunity to build relationships with local families.
	Activity-based learning: Visitors participate in activities and experiences that allow them to learn about the local culture and traditions.
	Historic market: Local markets where visitors can observe and participate in commerce and trade. Visitors may have the opportunity to purchase local products.
	Museum: Visitors visit local museums, where they can learn about the history, culture, and traditions of the local community. Local artifacts, such as textiles, pottery, and other cultural treasures, will be displayed.
	Farm station: Local farms where visitors can observe and participate in agricultural activities and learn about local food production.

Table 1 *(continue)*

Major indicators	Category
Operational management	**Single cluster:** Visitors typically stay in one place and participate in activities on offer in or near the community center.
	Multi-center: Visitors may travel between different sites to participate in various activities and experiences, which is suitable for larger areas with multiple sites or diverse activities and experiences.
	Activity bases: Some CBT sites may offer a limited number of activities, while others may offer a wider range.
Years of establishment	**Established (years):** Those in existence for a longer period may have a stronger reputation, more established relationships with local communities and suppliers, and more developed infrastructure and facilities.
Activation after the lifting of restrictions	**Inactive/partial open/fully operational *in-situ* state**: Whether the tourism community is able to adapt to the pandemic and/or remain operational during and after the restrictions are lifted.
Spatial information	**Gathering area in total (sq. m.):** A designated space that is a focal point for tourist activities and allows visitors to experience local culture and traditions.
	The average opening ratio (wall-to-windows) measures the amount of window area relative to the total wall area of a building. The average opening ratio is expressed as a percentage and is used to assess the amount of natural light and ventilation a building receives.
Capacity (comparing pre- and post-COVID-19)	**Maximum visitor number:** The maximum number of people allowed to enter or be present in a specific activity base at any given time.
	Spatial capacity: The maximum number of visitors a destination can accommodate.
	Change: In the spatial capacity ratio, the value pre-COVID-19 is divided by the post-COVID-19 spatial capacity number.

Source: Author's work

involve rearranging the furniture to create more space or reducing the number of chairs or tables. Therefore, the carrying capacity of places has been significantly reduced and changed over time to fit the *in-situ* conditions (Bañón & Bañón, 2020). However, safety space (particularly enclosed space) is strongly related to cumulative exposure time, the degree of ventilation and air filtration, dimensions of the room, breathing rate, respiratory activity, face-mask use of its occupants, and the infectiousness of respiratory aerosols (Bazant & Bush, 2021). Thus, the carrying capacity is a key policy measure for linking the planning of public spaces and well-being issues. Due to the continued expansion of tourism communities, this study's results are expected to clarify how to manage and improve spatial capacity in the post-COVID-19 era to suit local communities in various contexts.

RESULTS AND DISCUSSION

Despite CBT being one of the country's flagship programs post-COVID-19, no official records are available on visitor numbers in tourism communities due to their

informality and management convenience. According to the interviews, three of the 19 communities keep visitor records, while the remainder estimate the number of visitors. Figure 3 shows the average number of visitors traveling to tourism communities in Ayutthaya per month over the past five years (2018–2022). National quarantines and travel restrictions have impacted tourism communities since April 2020. The average number of visitors to tourism communities dropped by almost 80% from the pre-COVID-19. Furthermore, community tourism was suspended for 18 months until October 2021, showing little sign of recovery until March 2022, when the situation started to improve. Most tourist destinations started to increase their visitor numbers six months before the end of the COVID-19 Emergency Decree on September 30, 2022. It indicates that the Ayutthaya tourism communities have started to regain their status as tourist destinations with a similar number of visitors as during the pre-COVID-19 period.

The number of visitors to the destination and its carrying capacity directly impact the use of resources (Teddlie & Tashakkori, 2009). Uncertainty about the number of expected visitors can significantly affect the spatial management of the local community, such as increased costs and employment instability. Additionally, it is widely accepted that many visitors can help build awareness of the community and its tourism offerings, potentially leading to further economic growth and community development. However, tourism providers must offset this against a higher risk of COVID-19 in crowded places, especially among the older rural population.

During the pandemic, many tourism communities had to temporarily close or significantly reduce their operations due to restrictions on travel and gatherings. Such limitations imposed by the government have resulted in a lack of participation, which is the major reason for the failure of CBT (Yodsurang et al., 2022), with many tourism communities having to

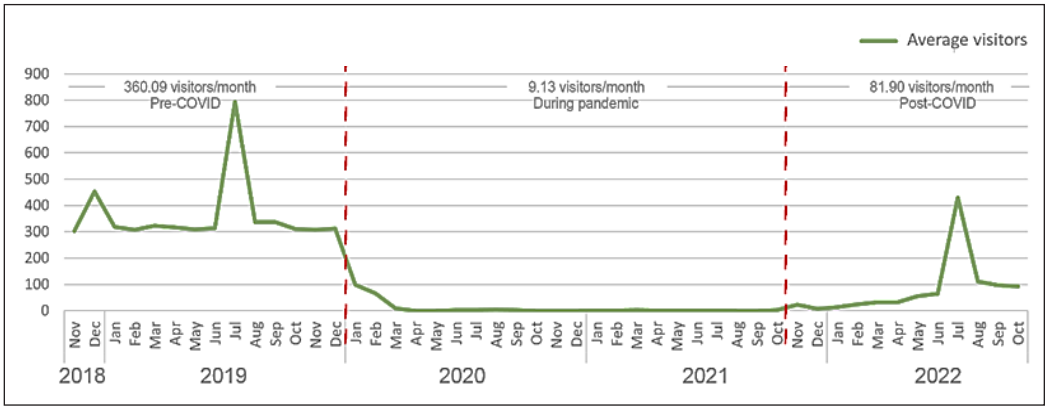

Figure 3. Average number of tourists over the past five years (2018–2022) in Ayutthaya's tourism communities
Source: Collecting data from the visitor logbook of a surveyed tourism community spanning from November 2018 to October 2022

discontinue their operations. Some tourism communities have survived the COVID-19 pandemic by being resilient and adapting to changing circumstances. CBT cannot offer new business models, such as online sales or delivery services, unlike any other business since they can only provide *in-situ* experience. The first step in understanding CBT post-COVID-19 is to study and identify the nature of operation and space management. The case studies were selected based on 19 tourism communities and 72 destinations/programs/activities covering 17,675 square meters of structures incorporating tourism (Table 2). Tourism communities still operating after the pandemic tend to be older, single-cluster, and more spatially flexible, particularly in relation to open spaces and ventilation.

Principal component analysis (PCA) was applied to the dataset to clarify the attributes and reduce the dimensionality of the data. Three significant components were then determined based on the dimensions (k) using the elbow method (Figure 4). The correlation circle presents the three-dimensional variance in the highest contribution to the Dim1 and Dim2 (Figure 5). The first dimension consists of multi-center, number of bases, fully operational, and post-COVID-19 events, and the second dimension is inactive, total gathering area, maximum number of visitors pre-COVID-19, and group excursion activities post-COVID-19. The third dimension consists of capacity post-COVID-19, single cluster, capacity pre-COVID-19, capacity change ratio, maximum number of visitors, individual activities post-COVID-19, and partly open. The varimax rotation technique was applied to the principal component axes, resulting in rotated components (RC) to enhance the interpretability of loadings. Details of the principal components are presented in Table 3.

Partly open tourism communities (0.50) are moderately represented by RC1, which can be highly explained by the post-COVID-19 capacity (0.89) and capacity change ratio (0.87) and moderately explained by the post-COVID-19 maximum number of visitors (0.57). Some centers or activities based in the community may remain closed due to the impact of COVID-19. Some areas or services may be unavailable, and their capacity is limited despite the open facilities. Many facilities have implemented various measures to reduce the risk of COVID-19 transmission, including limiting their capacity, implementing social distancing guidelines, and requiring a face mask. Thus, capacity and visitor numbers may be reduced to follow the social distancing guidelines or recommendations. However, it is difficult to provide specific information on capacity changes or maximum visitor numbers at a specific location or facility post-COVID-19 since these can vary considerably depending on the location, facility, and government guidelines in place at the time.

Multi-center tourism communities (0.99) with several activity bases (0.97) remained fully operational (0.87) during the COVID-19 pandemic, depending on the RC2 having a high explanation level. These tourism communities implemented

Table 2
Summary data on 19 tourism communities in Ayutthaya pre- and post-COVID-19

ID	Main activities	Center	Established (yrs)	Active	Number of bases	Total gathering area (sq.m.)	Opening ratio (windows-to-wall) %	Pre-COVID		Post-COVID		Change
								Maximum number of visitors	Capacity	Maximum number of visitors	Capacity	
1	Homestay/activity-based learning	single cluster	31	●	6	217	86.67	15	2.41	12	3.01	1.25
2	Historic market/activity-based learning/museum	multi-center	40	●	6	505	46.67	40	2.10	20	4.21	2.00
3	Activity-based learning/homestay	multi-center	5	○	6	711	65.00	30	3.95	30	3.95	1.00
4	Homestay	single cluster	5	●	2	335	20.00	20	8.38	16	10.47	1.25
5	Activity-based learning/farm station	single cluster	6	○	3	820	40.00	80	3.42	15	18.22	5.33
6	Homestay/activity-based learning	multi-center	3	×	6	498	73.33	60	1.38	40	2.08	1.50
7	Homestay/activity-based learning	single cluster	25	○	7	842	85.71	25	4.81	15	8.02	1.67
8	Event	single cluster	4	○	1	80	100.00	20	4.00	10	8.00	2.00
9	Activity-based learning/homestay	multi-center	9	×	6	3115	86.67	150	3.46	70	7.42	2.14
10	Activity-based learning/museum/ farm station	multi-center	43	×	4	1448	60.00	200	1.81	40	9.05	5.00
11	Event	multi-center	13	×	5	740	84.00	60	2.47	30	4.93	2.00
12	Homestay/activity-based learning	multi-center	4	○	1	80	50.00	20	4.00	15	5.33	1.33
13	Homestay	single cluster	19	●	1	216	20.00	20	10.80	15	14.40	1.33
14	Farm station	single cluster	5	●	2	162	60.00	40	2.03	20	4.05	2.00
15	Activity-based learning/farm station	multi-center	4	×	3	370	73.33	20	6.17	10	12.33	2.00
16	Homestay	single cluster	11	○	1	304	100.00	40	7.60	30	10.13	1.33
17	Activity-based learning/farm station	multi-center	3	×	5	6562	48.00	800	1.64	400	3.28	2.00
18	activity-based learning/farm station	multi-center	4	×	3	404	20.00	60	2.24	30	4.49	2.00
19	Farm station	single cluster	11	○	5	266	68.00	30	1.77	20	2.66	1.50

Note. × = inactive, ○ = partly open, ● = fully operational
Source: Author's work

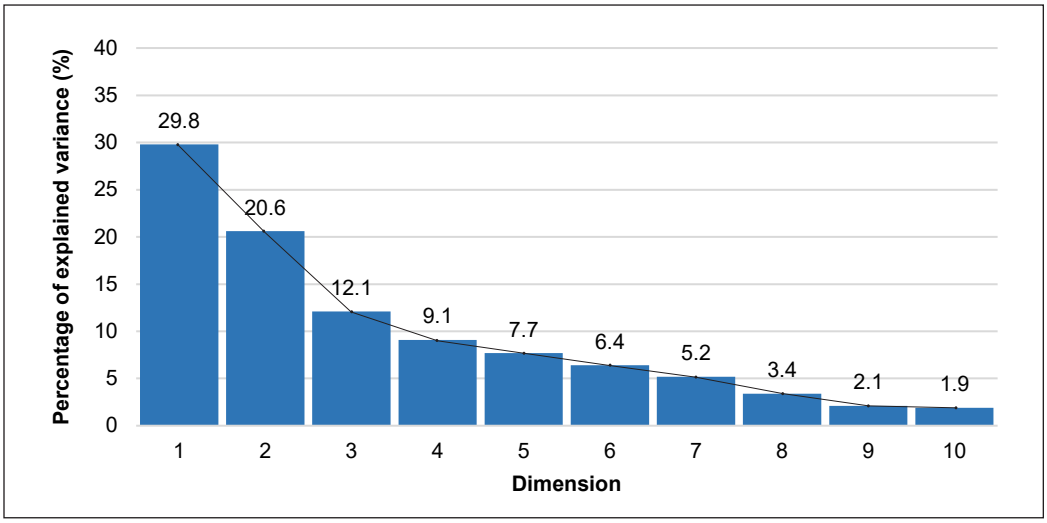

Figure 4. The first three PCs capture 62.5% of the variance in the scree plot
Source: Author's work

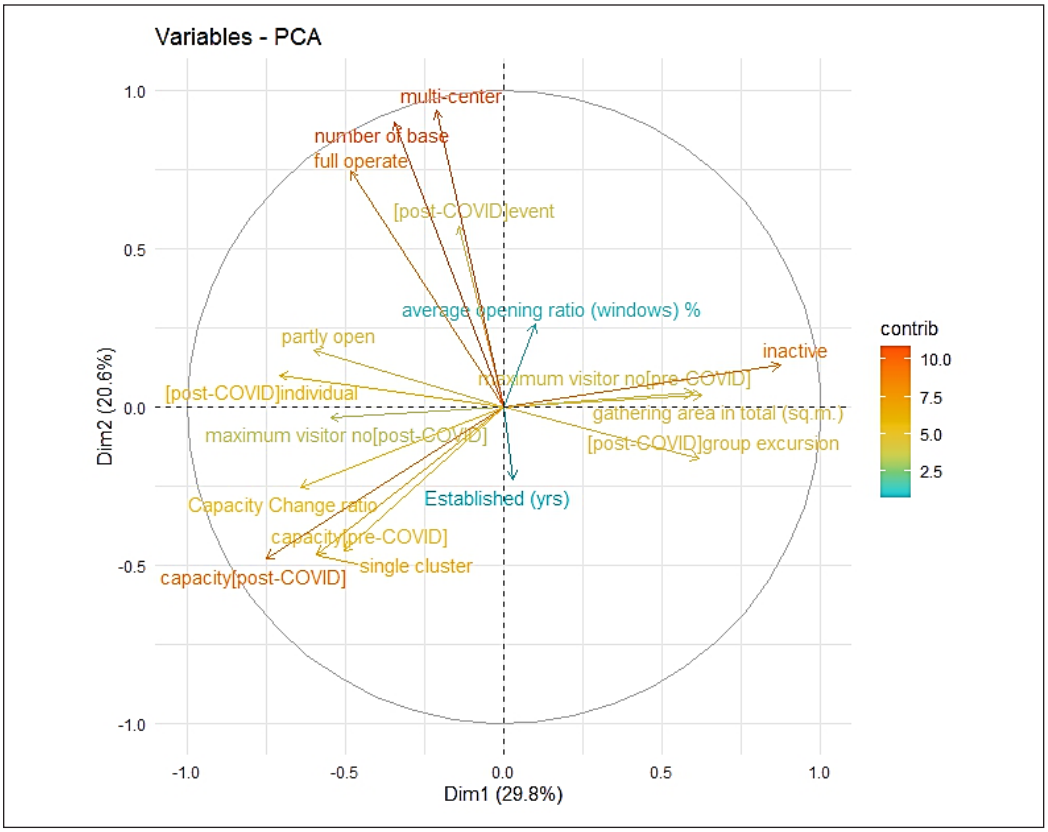

Figure 5. PCA correlation circle shows the highest contribution of variance influencing a principal component
Source: Author's work

Table 3
The principal component index shows the strength of the correlation, where 0.5 is considered important for defining the principal component

	RC1		RC2		RC3
[Post-COVID-19] Capacity	0.89	Multi-center	0.99	[Post-COVID-19] Event	0.62
Capacity change ratio	0.86	Number of bases	0.97	Average opening ratio (windows) %	0.53
[Post-COVID-19] Maximum number of visitors	0.57	Fully operational	0.87	Single cluster	0.52
Partly open	0.50			Total gathering area (sq. m.)	-0.68
[Post-COVID-19] Event	-0.51			[pre-COVID-19] Maximum number of visitors	-0.70
Average opening ratio (windows) %	-0.59			[Post-COVID-19] Group excursions	-0.86
Inactive	-0.82				

Note. RC = Rotated Component
Source: Author's work

adequate health and safety measures, particularly social distancing protocols, allowing them to be fully operational during the pandemic. CBT destinations with multi-center activities tend to have plenty of space. Activities take place in multiple locations within the destination rather than in a single centralized location. The availability of space can be a major attraction for tourists. For example, a destination with plenty of space might be able to host outdoor farming, certain festivals, events, and other large-scale activities. The open space could also be used for more low-key activities, such as picnics, leisurely walks, and other recreational activities.

Event-led tourism communities and average opening (windows-to-wall) ratio, represented on average (-0.51 to -0.59 and 0.53 to 0.62) by RC1-negative and RC3, were impacted by single cluster (0.52) and inactive CBT (-0.82). Some tourism communities were unable to operate during the pandemic due to the measures put in place to reduce the risk of COVID-19 transmission, such as restrictions on gatherings and social distancing requirements. These measures significantly impacted event-led tourism communities, with many events postponed, canceled, or converted into a virtual format. Besides, most of these communities had limited capacity to comply with social distancing guidelines, making it difficult for organizers to generate revenue and requiring them to reimagine their event format or venue.

Since RC1-negative was highly explained by the inactive cases (-0.82) and average explained by the opening (windows-to-wall) ratio (-0.59), it was suggested that the lack of adequate ventilation seemed to have increased the risk of COVID-19 transmission, which could be a contributory factor in the closure or inactivity of tourism

communities, particularly in the context of the pandemic. Good ventilation is important for reducing the risk of COVID-19 transmission in indoor spaces. However, none of the local places are equipped with an active HEPA filter, which can help to remove small particles, including viruses and other contaminants, from the air. The infrastructure of a tourism community with less than adequate ventilation space, such as those in dense areas or smaller, enclosed spaces, may be particularly affected by social distancing measures and other COVID-19 restrictions. For example, indoor attractions and museums may have to limit the number of visitors allowed at one time or close certain exhibits or areas to maintain social distancing. Such facilities have had to temporarily close or significantly reduce their operations.

The result revealed that multi-center community tourism allows for a more distributed tourism flow, which can help to avoid overcrowding and the overuse of specific attractions. For example, suppose one tourism site is closed due to unforeseen circumstances, such as a natural disaster, a disease outbreak, or other reasons. In that case, visitors can be redirected to other open spots. It can be important in managing the carrying capacity of the destination and maintaining its sustainability. Decentralizing allows tourism communities to flexibly balance between pandemic control and local tourism revitalization (Huynh et al., 2022). However, space utilization requires some consideration since an underserved group may use an open space vulnerable to COVID-19 infection. A post-pandemic analysis recommends that the open space provide a high sense of control with clear orientation and multipurpose facilities such as benches and a socializing area. In contrast, it was difficult for event-led activities to survive during the pandemic since they often had to close due to an outbreak. However, it is important to note that both models have advantages and disadvantages, and the best approach depends on the specific context and circumstances of the tourism community.

The tourism community's spatial adaptability and geospatial tourism capability have played a crucial role in its resilience during the pandemic. Spatial adaptation is important for pandemic resilience and could include decentralized activities, resilience-building typologies, restricted commute time, diverse mode choices, and a balanced allocation of services and facilities (Manifesty & Lee, 2022; Yang et al., 2021). Specifically, diversified rural communities gain flexibility and resilience from spatial clustering (Hu & Zhang, 2022). Consequently, multi-center communities with a number of activity bases were able to remain fully operational. They provided flexibility in responding to changing circumstances and should be prepared for a future crisis not only in the context of tourism businesses but also for tourists, locals, and stakeholders (Pocinho et al., 2022).

Undoubtedly, spatial resiliency has become a crucial topic in the post-COVID-19 era since it involves ensuring that the built

environment can withstand and adapt to unexpected shocks such as pandemics. Although a study on crisis adaptation in the CBT community in Ban Maung Nong Khai, Thailand (Sann et al., 2023) discussed social and economic resilience to the pandemic, nothing was mentioned about the spatial aspect of the tourism community. A previous study on spatial intervention in Kampoeng Boenga Grangsil, Indonesia (Wikantiyoso et al., 2022) provided a checklist for space design innovations to meet health protocols, including sanitary stations, sufficient room openings, 80% of open space, open space facilities, and shade-free pedestrians. Ding et al. (2022) suggested that policy (The National Landscape Garden Cities in China policy) could play an important role in creating city resilience, especially during the COVID-19 pandemic. It can be achieved by ensuring that disaster-avoidance green spaces constitute 85% or more of the urban landscape, thus creating disaster-proof composite spaces.

In CBT destinations, spatial flexibility could allow for the use of open spaces for a variety of purposes. Additionally, flexibility in terms of ventilation can ensure the space is comfortable and safe for visitors, especially during the COVID-19 pandemic, where good ventilation is crucial for reducing the spread of the virus. Overall, spatial flexibility is important for creating a versatile and functional space that can support a variety of activities and uses. However, several communities have discontinued their operations due to the COVID-19 pandemic. It has been difficult to gather in groups, which can have a negative impact on the sense of community and social connections within it, particularly for a newly established tourism community. Thus, spatial resiliency in the post-COVID-19 era must involve designing the built environment to make it more flexible, adaptable, and healthy. Spatial management in the tourism community is just one example of how spatial resiliency is being implemented to address the challenges brought about by the pandemic.

CONCLUSION

The multi-center tourism community with a number of activity bases and sufficient space available is unlikely to be a limited factor by the number of tourists allowed. Multi-center spaces tend to have sufficient tourism facilities to support the anticipated number of tourists. However, if the centers were closed/unable to operate or restrictions were placed on the number of people gathering in one place at the same time, it could spill over to the neighborhood's tourism activities. In contrast to the multi-center, single cluster community tourism offers the advantage of being easier to manage and quality controllable. However, the failure of the central hub could have a detrimental impact on the entire tourism sector. The dependency on a single center for tourism operations creates vulnerability and increases the risk of failure. Therefore, diversifying tourism activities across multiple centers is crucial for ensuring resilience and mitigating the potential negative consequences of a struggling or non-functional central hub. Distributing tourism activities and

facilities can minimize the risks associated with relying solely on one center, leading to a more robust and sustainable regional tourism industry.

Therefore, the availability of space was a key factor in promoting resilience in tourism communities during the pandemic while helping to make the local tourism community more resilient. The limitation of this finding is that the results primarily focus on the spatial management scheme within CBT operation and do not extensively consider any influences of external factors such as policy frameworks, economic conditions, and accessibility constraints. The research findings highlight the significance of space availability in establishing multi-center tourism communities. The extent to which space availability contributes to a sense of resilience remains a topic for further investigation. By incorporating the above-mentioned external factors, the research outcome could provide a more holistic understanding of the complexities of spatial management in CBT. This broader perspective would enable researchers and practitioners to develop more comprehensive strategies that consider the interdependencies between spatial management and policy frameworks, economic conditions, and accessibility constraints, thereby enhancing the resilience and sustainability of CBT initiatives in other areas.

However, some health measures still need to be taken to prevent the risk of spreading the disease and keep people safe from infection even post-COVID-19. It is especially important for rural people with limited access to healthcare and other resources. There are certain health measures people can take to protect themselves and others. However, the two-meter distancing (or six feet) rule may not be applicable in rural areas. Several communities with a considerable amount of open space and the ability to allow more than four square meters per person have been unable to continue.

The spatial management of CBT plays a pivotal role in enhancing resilience and ensuring sustainable practices amidst health crises. Diversifying tourism activities across multiple centers, rather than relying solely on a centralized hub, is crucial for mitigating risk and strengthening the overall resilience of tourism communities. This approach allows for better crowd management, reduces the impact of disruptions to any single center, and promotes a more equitable distribution of tourism benefits. While adequate space is essential for effective spatial management, it is equally important to consider the broader context in which CBT operates. Policy frameworks, economic conditions, and accessibility constraints influence communities' ability to implement effective spatial management strategies. A deeper understanding of these interdependencies is necessary to develop comprehensive and sustainable CBT initiatives that can withstand the challenges of health crises and foster long-term resilience.

Amidst the COVID-19 challenges of neoliberal policies and pandemic-induced disruptions, communities seek to transition to sustainable tourism to foster economic

resilience and social justice (Moayerian et al., 2022). To address these challenges, policymakers and practitioners must adopt a holistic approach encompassing spatial management, health measures, and the broader external factors that shape CBT operations. Tailored health protocols should be developed for rural areas, taking into account their unique characteristics and space limitations. Additionally, comprehensive policy frameworks that support CBT communities in managing space availability while promoting diversification and implementing effective health measures should be established. By working collaboratively, policymakers and practitioners can foster resilient and sustainable CBT communities capable of adapting to the ever-changing landscape of health crises. This collaborative effort would ensure the continued viability of CBT and contribute to the economic well-being of local communities and the preservation of their unique cultures and environments.

The current context of post-pandemic recovery demands a nuanced exploration of spatial management within CBT operations (Fenitra et al., 2022; Pan et al., 2022). The discourse on resilience expands to encompass the evolving landscape of health crises and the enduring impacts of neoliberal policies. Communities grappling with the disruptions induced by the pandemic are strategically embracing sustainable tourism as a catalyst for economic resilience and social justice. This transition underscores the pivotal role of spatial management in CBT, not only in mitigating risks and ensuring sustainable practices but also in fostering adaptability to the challenges posed by the shifting global context. Policymakers and practitioners must adopt a forward-looking perspective integrating spatial considerations with effective health protocols and comprehensive policy frameworks. This holistic approach ensures that CBT communities not only withstand the immediate shocks of health crises but also thrive in the face of ongoing uncertainties, contributing meaningfully to local economies and cultural preservation.

Implications for Practice

The enriched discussion on post-pandemic resilience in CBT offers significant implications for practice. Practitioners should recognize the heightened importance of spatial management in the recovery phase, acknowledging that the availability of space is a linchpin for effective crowd management and visitor safety. Embracing a multi-center approach, rather than relying solely on a centralized hub, emerges as a strategic practice to mitigate risks and enhance overall resilience. Diversifying tourism activities across multiple centers safeguards against the failure of a single hub and promotes equitable distribution of tourism benefits. Moreover, integrating tailored health protocols, especially for rural areas with unique characteristics and space limitations, is imperative for protecting residents and tourists in the post-COVID era. Policymakers and practitioners must collaboratively develop and implement comprehensive policy

frameworks that support CBT communities in managing space effectively while fostering diversification and implementing health measures. This approach ensures that CBT practices endure the immediate challenges of health crises and contribute substantively to local communities' long-term sustainability and well-being.

Limitations and Recommendations for Future Research

While the study revealed the pivotal role of spatial management in post-pandemic CBT, certain limitations merit consideration. The research primarily focuses on the spatial management scheme within CBT operations and does not extensively delve into external influences such as policy frameworks, economic conditions, and accessibility constraints. This limitation suggests a potential gap in understanding the holistic dynamics influencing CBT resilience. Future research endeavors should adopt a more comprehensive approach to address these limitations and enrich the discourse. Investigating the interdependencies between spatial management, policy frameworks, economic conditions, and accessibility constraints could offer a more nuanced understanding of CBT resilience. Additionally, exploring the effectiveness of tailored health protocols in diverse rural settings, considering variations in space limitations, can contribute valuable insights for post-pandemic tourism practices. Moreover, longitudinal studies tracking the implementation of spatial management strategies in CBT communities over time would provide a deeper understanding of their sustained impact on resilience. Future research initiatives could also explore integrating technology in spatial management practices and its implications for CBT resilience in the evolving landscape of health crises.

ACKNOWLEDGEMENT

This work (Grant No. RGNS 64-029) was supported by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (OPS MHESI), Thailand Science Research and Innovation (TSRI), and Kasetsart University.

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