

Study of Application of Geo-Information Technology to Spatial Survey and Assessment of Creative Tourism Potential in Baan Noi Rim Khlong Community*

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Abstract

This research aims to achieve four objectives: first, to utilize geo-information technology for spatial exploration and data mapping in the Baan Noi Rim Khlong community of Sa Kaeo province; second, to evaluate the potential of these tourism resources; third, to assess the feasibility of developing creative tourism resources; and fourth, to analyze the network by considering the conditions of distance and travel time to arrange suitable tourism routes. The researcher collected data from the three sample groups: 1) stakeholders, agencies, and local government organizations; 2) community members involved in tourism management; and 3) tourists. A qualitative analysis was performed to identify current situational problems and obstacles, SWOT analysis, and potential in various areas; thirdly, to assess the feasibility of developing creative tourism resources by categorizing and evaluating four resource groups: cultural heritage, way of life, arts, and products catering to various demands by the group of experts; and finally, to analyze the network by considering the conditions of distance and travel time to arrange suitable tourism routes. The research findings reveal: 1) Tourism Resource Potential: The area's natural resources support tourism and interactive activities with local villagers; 2) Tourist Potential: Tourists seeking community-based experiences are highly satisfied. Needed improvements include better public transport, local transportation, and diverse tourism programs. The tourist demand is focused on diverse and small-group activities, along with greater engagement with the community. 3) Market and Business Potential: social media and influencer promotion have boosted tourist interest in homestays, but

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limited availability remains a challenge. The community product business lacks online sales channels. In addition, the overall readiness of tourism resources was found to be high, with an average score of 4.04, indicating a high possibility for the development of sustainable creative tourism destinations. Subsequently, network analysis using Dijkstra's algorithm was conducted to optimize tourism routes. The findings of this research can serve as guidelines for spatial management and developmental planning, fostering outstanding creative tourism destinations and sustainable income generation for local communities.

Keywords: Geo-information technology; creative tourism; Baan Noi Rim Khlong community

Introduction

The current state of tourism in Thailand has shown promising adjustments due to the relaxation of government policies and the alleviation of the COVID-19 pandemic situation. Domestic tourist arrivals have surged to 226,672,561, generating revenue of up to 1,222,074.08 million baht. Comparing these figures to the year 2021, there has been an increase of 194.51% in tourist arrivals and 317.53% in revenue (Ministry of Tourism and Sports, 2022). The tourism industry plays a crucial role in revitalizing Thailand's economy and society rapidly, aligning with the National 20-Year Strategy and the 12th National Economic and Social Development Plan. These policies underscore the importance of using tourism as a key mechanism for economic and social recovery. Tourism has fostered innovation and creative activities, enhanced local potential, and created distinctive identities. Furthermore, creative tourism serves as a tool for income generation, leading to balanced and sustainable community economic growth and fostering mutual benefits between local communities and tourism businesses (Iamchuen et al., 2022). Additionally, there is a growing preference for experiential tourism, emphasizing community immersion and participatory activities. Thus, creative tourism emerges as a responsive form of tourism that caters to the evolving needs of tourists.

Sa Kaeo Province is one of the 55 provinces included in the "Secondary City Tourism Promotion" policy, as reported in the 2022 tourist statistics by the Ministry of Tourism and Sports. The report revealed that the number of tourists visiting the province in the year 2022, totaled 1,134,751, generating revenue of 3,552.28 million baht. (Ministry of Tourism and Sports, 2022). This indicates a lower popularity among tourists compared to secondary cities in other provinces. Therefore, there is a need to adjust the tourism strategic plan to attract tourists and revive the

province's economy. It is essential to enhance the potential of tourist attractions and develop tourism models that meet tourists' needs to attract more visitors to the province.

Baan Noi Rim Khlong community is located between 3 villages: 1) Wang Charoen and 2) Thung Kabin in Wang Mai Subdistrict, Wang Somboon District; and 3) Thap Luang in Ta Lang Nai Subdistrict, Wang Nam Yen District, Sa Kaeo Province. The total area of the community is approximately 29.25 square kilometers, which is a community endowed with natural resources. Tourists can engage in community-based activities, such as nature exploration, hiking, kayaking, and culinary experiences, to immerse themselves in local culture. Additionally, nearby tourist attractions contribute to the tourism appeal of the area. Moreover, the residents primarily engage in agricultural activities and maintain a rural lifestyle, making it suitable for development into a prominent landmark of the province. Despite abundant natural resources, rural communities often lack the knowledge and creativity required for tourism development, distinctiveness, and diverse tourism activities. Most tourists merely pass through on their way to major cities, as compared to neighboring tourist destinations. Feedback from tourists suggests that the community boasts a pleasant atmosphere but lacks engaging activities and unique selling points for tourism. Additionally, the community serves as a local product producer but faces challenges in online marketing and public relations to promote its products effectively (Meepong, 2022).

Geo-information technology integrates knowledge and technology in remote sensing, geographic information systems (GIS), and global navigation satellite systems (GNSS) for various applications (GISTDA, 2009). This technology can enhance the efficiency of managing spatially related data by referencing geographic coordinates (Witheetrirong, 2019). When integrated with the tourism of the Baan Noi Rim Khlong community, it becomes a valuable tool for data management, data storage, spatial planning, and enhancing the potential of creative tourism.

Recognizing these challenges, researchers emphasize the importance of leveraging geo-information technology to conduct spatial exploration and evaluate the creative tourism potential of the Baan Noi Rim Khlong community. This assessment aims to enhance the community's tourism potential by elevating its economic status sustainably and helping residents achieve self-reliance. It also aligns with the province's policy to accelerate the development of secondary city tourism areas.

Research Objectives

1. To utilize geo-information technology for spatial exploration and data mapping in the Baan Noi Rim Khlong community of Sa Kaeo province
2. To evaluate the resource potential for tourism in the Baan Noi Rim Khlong community
3. To assess the feasibility of developing creative tourism resources
4. To analyze the network by considering the conditions of distance and travel time to arrange suitable tourism routes.

Limitations of the study

Baan Noi Rim Khlong community is situated between 3 villages: 1) Wang Charoen and 2) Thung Kabin in Wang Mai Subdistrict, Wang Somboon District; and 3) Thap Luang in Ta Lang Nai Subdistrict, Wang Nam Yen District, Sa Kaeo Province. The total area of the community is approximately 29.25 square kilometers, which is a community endowed with natural resources (Figure 2).

Literature Review

In the realm of tourism, creative tourism stands as a distinctive form of community-based tourism. Creative tourism is "tourism that offers visitors the opportunity to develop their creative potential through active participation in courses and learning experiences that are characteristic of the holiday destination where they are undertaken" (Richards & Raymond, 2000). Creative tourism leverages the community's potential as its foundation by allowing tourists to actively engage in experiential learning activities with residents (Suwanvijit, 2018).

The Department of Tourism, Ministry of Tourism and Sports, asserts that Creative Tourism is a tourism development process driven by creative thinking, predicated on three fundamental principles: 1) leveraging existing cultural capital, 2) emphasizing participation and authentic experiences, and 3) fostering tourism differentiation through creative thinking. In managing Creative Tourism destinations, achieving balance across two dimensions is essential: the tourist dimension and the host or tourism resource owner dimension, ensuring balanced development for both parties involved (Department of Tourism, Ministry of Tourism and Sports, 2017).

Geo-information technology is "the integration of knowledge and technologies in remote sensing, Geographic Information System (GIS), and Global Navigation Satellite System (GNSS) for efficient application across various domains" (GISTDA, 2009). Geo-information technology enhances efficiency in managing spatially-related data, which are referenced to geographic coordinates (Witheetrairong, 2019), and geographic data into two categories: spatial data and attribute data, both stored in geographic databases and interconnected (Arikul, 2017).

Currently, travel planning utilizes various methodologies to support travel, reducing costs and travel time. One significant approach is employing network analysis to determine the shortest path (Hunwisai, 2022), ensuring travel aligns with specific objectives, such as tourism or medical service accessibility. Network analysis involves analyzing paths within a connected set of lines, determining the most suitable route or nearest convenience (Verbyla, 2002; Aunphoklang, 2012). Dijkstra's algorithm is a method used to solve the Shortest Path Problem (Arpamongkolrat & Poolsawat, 2017; Hunwisai, 2022). It calculates the shortest path between vertices, ensuring that data transmission from the source to the destination follows the shortest route. This algorithm has gained popularity in travel planning and was developed by Edsger Wybe Dijkstra in 1959. The algorithm is utilized to compute the shortest path in a weighted graph without directionality, where all vertex weights are positive. It finds the shortest route from an initial vertex to any other vertex (Aunphoklang & Sangphong, 2023).

Langkulkasattrin and Akasuwan applied Geographic Information Systems to promote community tourism in the Koh Yo Sub-district, Mueang District, Songkhla Province. The study involved surveying and compiling a database of tourist attractions and amenities, utilizing GPS and Google Earth to explore coordinates and survey field areas. Questionnaires and interviews were conducted to gather physical data. Network analysis was also performed to determine tourist routes. The research findings revealed that tourism maps were disseminated through websites, and feedback from residents, relevant organizations, and tourists was collected to analyze future tourism development strategies (Langkulkasattrin & Akasuwan, 2018). Furthermore, Phuthong, Jaroenjit, and Zhou utilized Geographic Information Systems to create a database of tourist attractions, along with various amenities, and delineated natural tourist routes using network analysis. This analysis yielded a total of six tourist routes, namely: 1) a fish-watching boat trip; 2) nature embracing; 3) a nature study route in Khao Sok National Park; 4) cave exploration and waterfall trekking; 5) temple

visitation; and 6) relaxing stroll in two parks. This research output allows local authorities to utilize the database for the management of natural tourist attractions in Khlong Sok Sub-district, Phanom District, Surat Thani Province, thereby enhancing its visibility and accessibility (Phuthong et al., 2016).

Research Methodology

Materials

The tools of this research include questionnaires and interview data, GPS devices, voice recorders, notebooks, cameras, computers, and the Geographic Information System (GIS) software Quantum GIS.

Research Methodology

The research project on the application of geo-information technology to conduct spatial surveys and analyze the creative tourism resource potential of the Baan Noi Rim Khlong community, Sa Kaeo Province, has the following details.

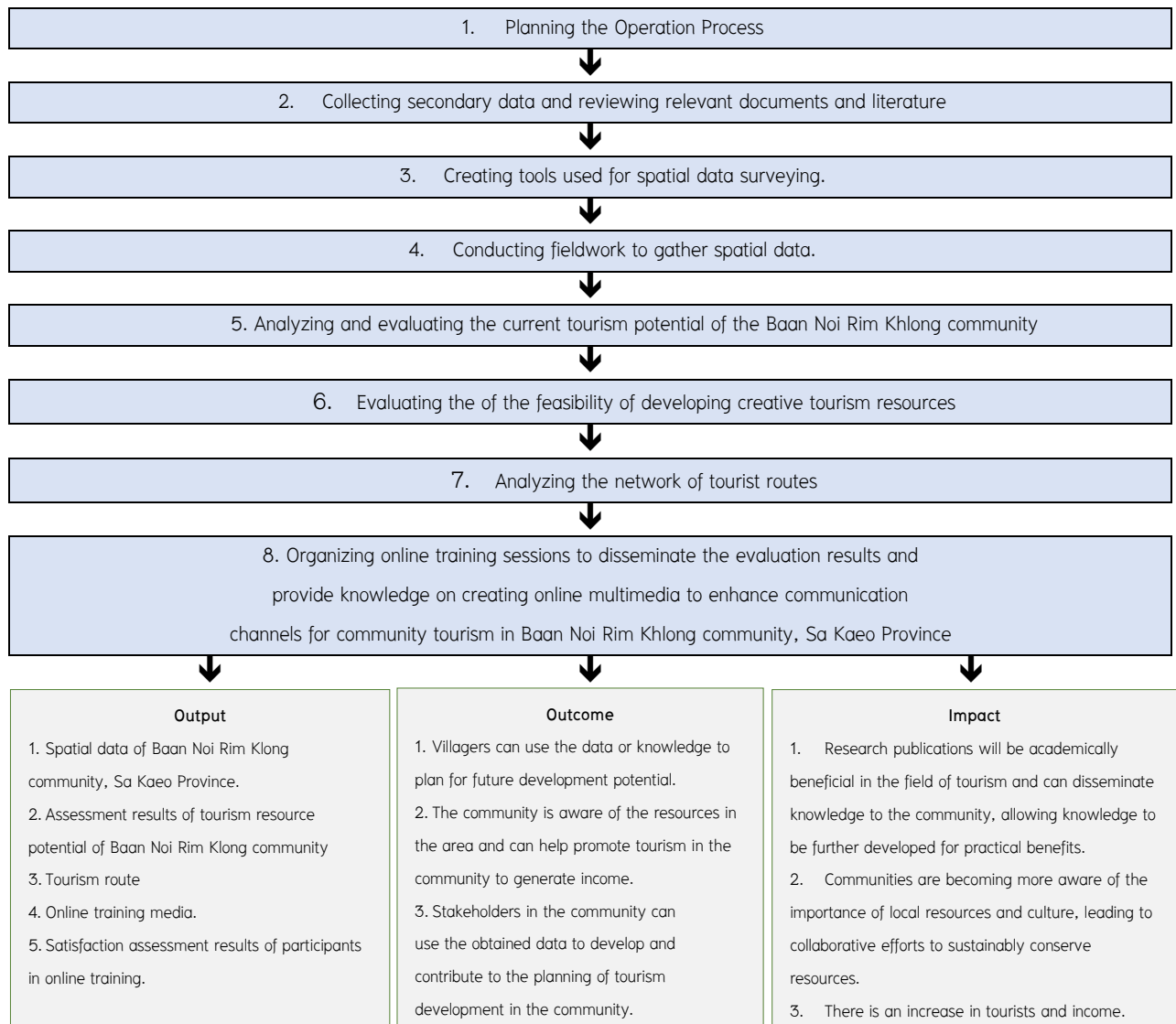


Figure 1 Research Methodology Framework

The research methodology framework is divided into nine steps, with the following details in Figure 3:

- 1) Planning the Operation Process
- 2) Collecting secondary data and reviewing relevant documents and literature.

The researcher has studied concepts and theories related to creative tourism, tourism standards, and the application of Geographic Information Technology in a spatial exploration of creative tourism. This involved reviewing literature from documents, research reports, and various websites. Secondary data was collected from different agencies, including data on administrative boundaries, transportation routes, land use in 2020, temples, hospitals, and healthcare facilities.

3) Creating tools used for spatial data surveying

The researcher developed research tools for this study, including interviews and questionnaire instruments for the sample groups. These tools underwent a validity check using the Index of Item Objective Congruence (IOC) with input from three experts. The evaluation results showed that the questions had IOC values ranging from 0.50 to 1.00, indicating high validity and suitability for use in the interviews and questionnaires. Both the interview and questionnaire instruments passed the IOC evaluation and were approved for ethical exemption under project code HEC-01-66-058. The researchers developed tools for this study using interview and questionnaire formats across four sample groups (see Table 1).

Table 1 Four target groups in this research

Target groups	Population	Sample groups
Group 1 – stakeholders, organizations, and local government agencies;	The group of stakeholders, agencies, and local administrative organizations of the Baan Noi Rim Khlong community.	The researcher selected 10 key members of the stakeholders, agencies, and local administrative organizations of the Baan Noi Rim Khlong community
Group 2 – community members involved in community-based tourism management in Baan Noi Rim Khlong	The group of community members involved in the management of community-based tourism in Baan Noi Rim Khlong totals 11,855 people (source: Wang Mai Subdistrict Administrative Organization website).	The researcher selected 10 key members from the group of community members involved in the management of community-based tourism in Baan Noi Rim Khlong.
Group 3 – tourists	The group of tourists in the Baan Noi Rim Khlong community, Sa Kaeo Province, a total of 1,000 people.	The group of tourists in the Baan Noi Rim Khlong community, Sa Kaeo Province, was determined by sampling 286 people based on Yamane's (1973) calculation.
Group 4 – experts	The experts from the Baan Noi Rim Khlong community, Sa Kaeo Province, and tourism specialists.	The experts from the Baan Noi Rim Khlong community, and tourism specialists will be selected using purposive sampling, with a total of 5 people to be interviewed.

4) Conducting fieldwork to gather spatial data.

The researchers conducted field surveys in the community of Baan Noi Rim Khlong, Sa Kaeo Province, and the surrounding areas of Sa Kaeo Province, such as tourist attractions and important sites. They collected data through interviews to gather opinions from stakeholders, local government agencies, and organizations, as well as from community members involved in community-based tourism management in Baan Noi Rim Khlong and tourists. They also collected data from qualified individuals using an assessment tool for the creative tourism resource potential of the Baan Noi Rim Khlong community, Sa Kaeo Province, to assess the possibilities for developing creative tourism resources.

5) Analyzing and evaluating the Current Tourism Potential of the Baan Noi Rim Khlong community

After obtaining data from interviews and questionnaires from the sample groups, for quantitative data, descriptive statistics will be analyzed, including counts, percentages, means, and standard deviations. For qualitative data analysis, the data will be categorized and classified the data according to relevant concepts and theories. Quantitative evaluation will be conducted using the Likert scale. The scoring criteria will range from 1 to 5, with 5 indicating the highest level of satisfaction or preference and 1 indicating the lowest level of satisfaction/preference (Khopolklang & Kaewsanga, 2017).

6) Evaluating the feasibility of developing creative tourism resources

Evaluating the creative tourism resources of the Baan Noi Rim Khlong community in Sa Kaeo Province to assess their development potential. Qualified individuals will categorize and assess these resources into four groups: cultural heritage, way of life, arts, and products that cater to varying needs. This evaluation will utilize Likert scale measurement criteria, offering respondents five levels of response ranging from least to most agreement (Khopolklang & Kaewsanga, 2017).

7) Analyzing the network of tourist routes.

Conducting a network analysis of the tourist routes involves preparing transportation network layers and location data layers of community tourist attractions in the Baan Noi Rim Khlong community and surrounding areas, Sa Kaeo province. Subsequently, performing the shortest path analysis using Dijkstra's algorithm and creating maps illustrating the tourist routes.

8) Organizing online training sessions to disseminate the evaluation results.

Results

This research study focuses on the application of geographic information technology in conducting spatial surveys of community-based tourism in Baan Noi Rim Khlong, Sa Kaeo Province. The researchers would like to present the research findings as follows:

1) The results from applying geo-information technology for spatial exploration and data mapping in the Baan Noi Rim Khlong community of Sa Kaeo province

1.1) Data collection

The researchers conducted the research according to the work plan and reviewed the literature and collected the secondary data, as shown in Table 2 (see Example in Figure 3–5).

Table 2 Secondary data,

Spatial Data Name	Types of Data	Data source
Administrative boundary data	Polygon	Land Development Department (LDD)
Transportation route data	Line	Adapted from Mitrearth
Land use data (Year 2020)	Polygon	Land Development Department
Temple data	Point	Adapted from Land Use Data (Year 2020), LDD
Hospital and healthcare service area data	Point	Adapted from Land Use Data (Year 2020), LDD
Tourism route data	Line	Collecting from network analysis techniques.

1.2) Primary data information gathering

The researchers have collected geospatial data of Sa Kaeo Province by conducting field surveys and utilizing GPS coordinates through the Google Street View application from the Google Maps website in the areas of Sa Kaeo Province, as shown in Table 3 (see Example in Figure 6–7).

Table 3 Primary data

Spatial Data Name	Types of Data	Data source
Tourist Attraction Data	Point	Field Data Survey
Petrol Station Data	Point	Field Data Survey
Electric Vehicle Charging Station Data	Point	Field Data Survey
Hotel and Resort Data	Point	Field Data Survey
Restaurant Data	Point	Field Data Survey



Figure 2 Map of the study area

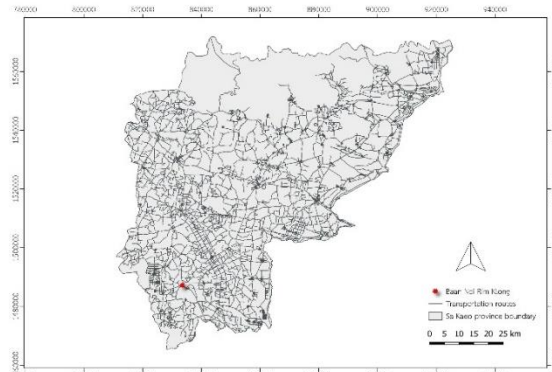


Figure 3 Map of the transportation routes of Sa Kaeo

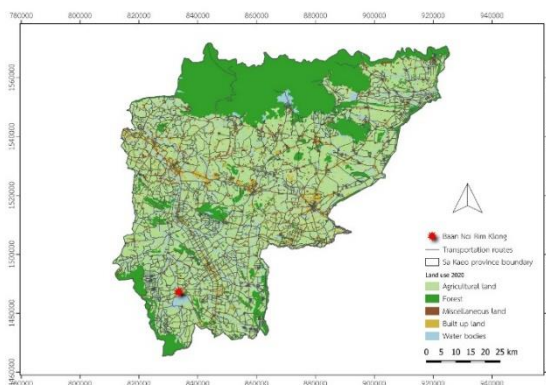


Figure 4 Map of Land use of Sa Kaeo in 2020

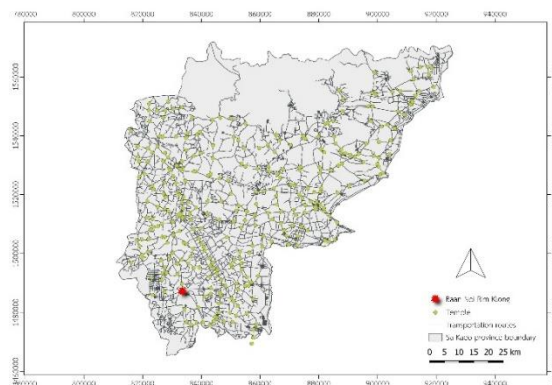


Figure 5 Map of the locations of temples in Sa Kaeo

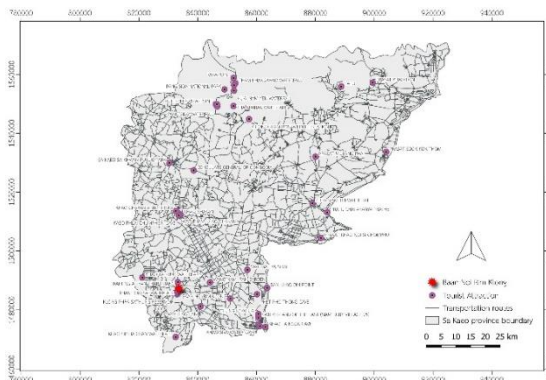


Figure 6 Map of the locations of tourist attractions in Sa Kaeo

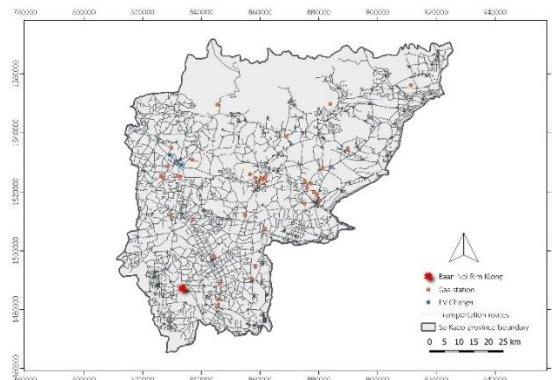


Figure 7 Map of the locations of gas and EV stations

2) Assessment results of the tourism potential of the Baan Noi Rim Khlong community

2.1) The results of the assessment of the tourism potential of the Baan Noi Rim Khlong community in Sa Kaeo Province. In this research, the researchers conducted data collection to conduct interviews and administer questionnaires to stakeholders to study the potential, problems,

and obstacles, as well as develop guidelines for the tourism potential of the Baan Noi Rim Khlong community in Sa Kaeo Province as follows:

Group 1, key stakeholders, organizations, and local government agencies, consisting of 10 individuals who represent the community as depicted in Figure 7, the research findings from interviews with stakeholders revealed that the majority were females aged between 41 and 60 years old, with educational attainment mostly below the bachelor's degree level. The predominant occupations were business owners, followed by government officials and local shopkeepers within the community.

From the perspective of stakeholders, organizations, and local government agencies regarding the current situation of the tourism destination of Baan Noi Rim Khlong community, Sa Kaeo province, it is found that the community is a popular tourist destination in Sa Kaeo province, especially among the target group of tourists who seek to experience local culture and actively participate in community activities. The community's strengths lie in its natural resources, which support tourism and creative activities while preserving local culture and traditions and involving community members. Additionally, in terms of marketing, there is promotion through influencers and online social media, attracting more tourists. Currently, the sub-district administrative organization plays a role in local development, such as budget allocation for canal excavation to create a floating market, providing water sources for agriculture to increase community income, and developing sustainable creative tourism. The main issues faced by the Baan Noi Rim Khlong community include a lack of budget for community development and the absence of online sales channels for local products due to the presence of products without online markets. Moreover, with the increasing number of tourists, the number of homestay businesses in the community remains low, leading to a higher demand for accommodation from tourists. Therefore, there is a need to enhance knowledge and promote awareness among community members regarding the importance of transforming houses into homestays to increase income and achieve sustainability. After a SWOT analysis for the development of creative tourism, it was found that the Baan Noi Rim Khlong community has strengths, such as being the first homestay in the community and attracting tourists interested in nature or experiencing local culture. The community also has strong leadership and a model agricultural wetland. Weaknesses include a lack of online marketing and ways of promotion despite having raw materials available. Opportunities include natural resources beneficial for community

product production and community guides for tourism. Challenges include the insufficiency of the budget for area development. Current activities attract tourists to the Baan Noi Rim Khlong community, including canal exploration, waterfall activities, royal barge paddling, bamboo lantern floating, traditional cooking, and camping.

Currently, activities that attract tourists to visit the Baan Noi Rim Khlong community include canal exploration, waterfall activities, paddling and exploring the royal barge, bamboo lantern floating, traditional cooking, and camping, among others. As for development guidelines for tourism, it is advisable to increase the variety of activities, create new tourist routes, and enhance online promotion to raise and foster awareness, so as knowledge development among locals to further develop homestays to accommodate tourists, for instance.

Group 2: Community members involved in the management of community tourism in Baan Noi Rim Khlong, consisting of 10 individuals who represent the community as seen on Figure 8. The research findings revealed that, from interviews with community members involved in the management of community tourism in Baan Noi Rim Khlong, there was an equal distribution between males and females, with a total of 5 individuals each. The majority fell within the age range of 51–60 years old, with most having educational attainment below a bachelor's degree and a monthly income of less than 10,000 baht. From the perspective of community members involved in the management of community tourism in Baan Noi Rim Khlong regarding various potentials for developing into a creative tourism destination, the summary is as follows:

1) The potential of tourism resources:

The Baan Noi Rim Khlong community and surrounding areas are notable, with several interesting tourist attractions and routes. These include attractions such as Tharn Sombun Waterfall, Tapluang Reservoir, Sadao Reservoir, Wat Khlong Phra Sathueng, Wat Mae Ya Som, and various agricultural gardens. Moreover, some activities can be developed into creative tourism activities, such as relaxation massage, canal kayaking, egg and vegetable picking, and fishing, among others. What distinguishes these attractions from others is the presence of natural resources in the community and nearby areas conducive to the development of creative tourism. Examples include Khlong Phra Sathueang, Tharn Sombun Waterfall, dams, national parks, mountains, fruit orchards, and caves. These are suitable for tourists who enjoy participatory tourism activities with local community members and seek to experience local culture. Additionally, popular tourism activities

targeted by travelers include canal kayaking, waterfall rafting at Tharn Sombun, exploring Tapluang Reservoir, and hiking. The SWOT analysis for developing into a creative tourism destination reveals that the strengths include the presence of natural resources along the canal, with dams and clean, quiet waterways. Weaknesses include the lack of illuminated pathways leading to the village and a shortage of motorbikes or hired vehicles for transportation. Opportunities lie in strong community leadership, while challenges include the lack of community participation and collaboration for creating livelihoods and exporting products.

2) The tourist potential of the community of Baan Noi Rim Khlong

The target tourist groups for the community of Baan Noi Rim Khlong are young travelers in the area who visit but do not stay overnight, and working-age travelers who come to stay with their families, either for day trips or overnight stays in homestays or tents. The objectives of their trips to the community include relaxation, learning about the local culture, and sightseeing. Tourists prefer to visit during festive seasons such as the New Year, Songkran Festival, and the hot season between March and April, with most opting for 2–3–day trips.

3) The marketing potential of the tourism industry in the community of Baan Noi Rim Khlong

The community products or goods of Baan Noi Rim Khlong that can generate income for the community and serve as souvenirs currently include catfish, climbing perch, snakehead fish, gourami fish, longan, mango, roasted chili paste, garden vegetables, herbal spa products, and chili paste. As for pricing, it is determined by middlemen, and in terms of tourism services in the community of Baan Noi Rim Khlong, they are determined by village elders and venue owners. In terms of tourism promotion in the community of Baan Noi Rim Khlong, information will be disseminated through online social media channels, and tourists who have previously visited the community will receive information. Currently, there are sufficient community guides available, but most tourists prefer to travel independently.

Group 3: Tourists of the Baan Noi Rim Khlong community, tourists of the Baan Noi Rim Khlong community, totaling 286 individuals, are being studied for their opinions regarding the potential of tourism resources, tourist data, market information, and tourism business aspects that could contribute to or promote creative tourism. The researchers summarized the results as follows.

The research findings indicate that, based on the responses from the survey conducted with tourists of the Baan Noi Rim Khlong community, the majority are females aged between 25–35 years old. Most have completed their undergraduate studies and work for private companies or their businesses. The next largest group consists of government employees, state organization staff, and private business owners. Their monthly income ranges between 10,001 and 20,000 Baht, and they reside in the eastern region. In terms of their travel behavior, most tourists have visited the Baan Noi Rim Khlong community 1–2 times, often traveling with 2–3 companions, mainly family members, for 2–3 days using private cars. The estimated travel expenses range from 1,001 – 3,000 Baht, with a willingness to spend an additional 300–600 Baht for participation in creative activities. While traveling, they prefer to stay in homestays, aiming to experience the canal atmosphere, taste local food, and learn about the community's way of life or local culture. Tourists are aware of promotional channels through social media platforms such as Facebook and YouTube.

The top 10 popular tourist destinations among tourists include Baan Noi Rim Khlong Farmstay Community, Tharn Sombun Waterfall, Wat Mae Ya Som, Wat Tham Khao Chakan, Phra Satheung Canal Reservoir, Khao Chakan Natural Wildlife Park, Thai–Cambodian Border Market, Khlong Hat district, Koh Sawat, Wang Nam Fah Garden, and Nam Siwa Waterfall Cave. Popular tourist activities include canoeing to explore and clean the Phra Satheung Canal, making merit by calming food for monks, and participating in bamboo rafting activities. This information has been utilized by researchers to analyze and develop tourist routes that meet the preferences of future tourists. After evaluating the satisfaction level of tourists towards the community–based creative tourism activities in Baan Noi Rim Khlong, it was found that the overall average satisfaction score was 4.20. When considering the evaluation of tourists' demand for community–based creative tourism activities in Baan Noi Rim Khlong, it can be divided into 3 aspects: 1) the format of the creative tourism activities; 2) the attractiveness and appeal of the tourism activities; and 3) the convenience facilities. The overall assessment of the level of demand across all aspects revealed that the highest level of demand had an average score of 4.75.

3) The results of evaluating the feasibility of developing creative tourism resources

Five experts are studying issues related to the categorization and assessment of creative tourism resources for the development of creative tourism. To summarize the findings as follows: The research found that from the survey responses of tourists from the Baan Noi Rim Khlong

community, the majority are female, aged between 31 and 40 years old, with the majority having completed undergraduate education. Most of them are employed in government or state organization positions, with a monthly income ranging between 20,001– 40,000 baht.

Regarding the categorization of creative tourism resources, they can be classified into four groups: Cultural heritage (CH), Lifestyle (LS), Arts (AT), and Products that cater to diverse needs (FC). The results of the assessment of these resources for development into creative tourism can be summarized as follows in Table 4.

Table 4 Assessment of creative tourism resources

Aspect of assessment of creative tourism resources	\bar{x}	<i>S. D.</i>	Level of Satisfaction
Cultural Heritage	4.7	0.29	The highest
Lifestyle	4.48	0.33	The highest
Arts	2.77	0.41	Moderate
Functional Creation	4.2	0.45	High
Total Average in All Aspects	4.04	0.37	High

From the evaluation of creative tourism resources in all aspects, it was found that the tourism resources are highly ready, with an average score of 4.04. This suggests a high possibility of development into creative tourism destinations.

4) The results of the analysis of the tourism route network.

Based on the data collected from stakeholders, agencies, local authorities, residents, tourists, and experts, insights into potential tourist destinations and activities suitable for creative tourism development have been obtained with trip duration and each package's budget. Analyzing travel routes through network analysis using Dijkstra's algorithm, a method for solving the shortest path problem, in the QGIS geographical information system software, resulted in the identification of travel routes from Baan Noi Rim Khlong Farm Stay to major tourist destinations or activity venues. Two groups were delineated: 1) 3-day, 2-night travel routes, and 2) 2-day, 1-night travel routes. The estimated costs per person for these routes are as follows: 1,950 baht per person for the 3-day, 2-night routes, and 1,200 baht per person for the 2-day, 1-night routes. This information is presented in Figures 8–13.

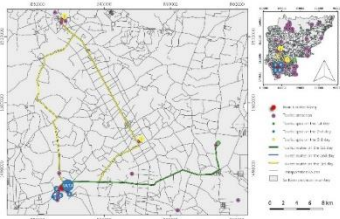


Figure 8 3-Day, 2-Night Route Package 1

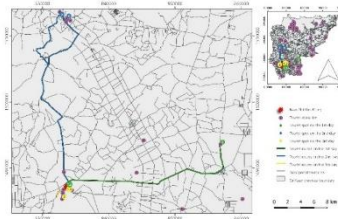


Figure 9 3-Day, 2-Night Route Package 2

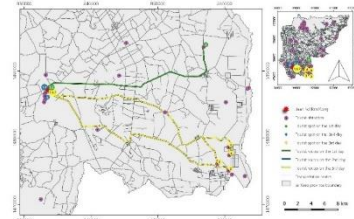


Figure 10 3-Day, 2-Night Route Package 3

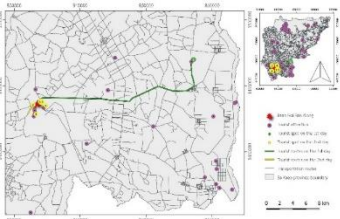


Figure 11 2-Day, 1-Night Route Package 1

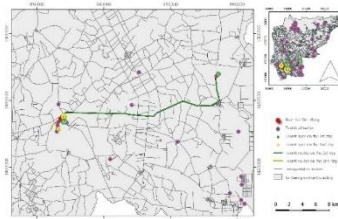


Figure 12 2-Day, 1-Night Route Package 2

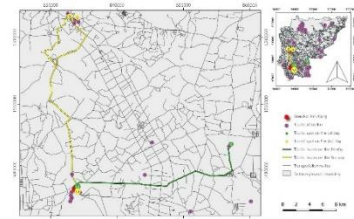


Figure 13 2-Day, 1-Night Route Package 3

5) Evaluation of participant satisfaction in online training on content creation and multimedia to enhance communication channels

The satisfaction assessment of participants in online training on content creation and multimedia for enhancing communication channels involved 69 individuals. The research findings revealed that the majority of attendees were female, aged under 25, with education levels below a bachelor's degree, and employed as students. Their monthly income was mostly below 10,000 baht, and they predominantly resided in the northeastern region. The evaluation of satisfaction levels among participants in online training on content creation and multimedia for enhancing communication channels is divided into four aspects: environmental conditions, input factors, processes, and outcomes. The overall average satisfaction level across all aspects was 4.66. Upon considering each aspect individually, the highest satisfaction was found in the outcome aspect, followed by environmental conditions, processes, and input factors.

Conclusions

The application of Geo-Information technology in the community-based tourism area survey of Baan Noi Rim Khlong, Sa Kaeo Province, enabled the collection of secondary data, including administrative boundary, transportation route, land use, temple, and hospital and healthcare service area data, and primary data was obtained from field surveys and Google Street View. Various layers of data were compiled using GIS techniques, including information on tourist destinations, gas stations, electric vehicle charging stations, hotels, and restaurants.

The current assessment of the community-based tourism potential in Baan Noi Rim Khlong reveals insights gathered from interviews and questionnaires conducted with stakeholders, including local authorities, community members involved in tourism management, and tourists. In evaluating various aspects of potential, it was found that in terms of tourism resources, the community boasts natural attractions conducive to tourism and actively engages in creative activities with residents. Concerning tourist potential, the primary target group comprises those who seek culturally immersive experiences and actively participate in community activities. Regarding marketing and tourism business potential, it was noted that tourist destinations and activities have been promoted through online social media channels and influencers, increasing tourist arrivals. However, the homestay business has garnered interest from tourists but struggles to accommodate them fully due to the limited number of homestay facilities available. In terms of community product manufacturing businesses, it was found that there is still a lack of online distribution channels. The assessment of tourist satisfaction levels towards the community-based creative tourism activities in Baan Noi Rim Khlong revealed high levels of satisfaction across all aspects, with an average score of 4.20. Areas for community improvement or development include insufficient and relatively expensive public transportation services to meet tourist demand, as well as a lack of hired transport services for tourists within the community. It is recommended to diversify tour programs and create souvenir products that reflect the identity of the Baan Noi Rim Khlong community. Additionally, there should be an increase in accommodation options to adequately accommodate tourists. The assessment of tourist demand for community-based creative tourism activities in Baan Noi Rim Khlong revealed the highest level of demand, with an average score of 4.75. The most desired aspects by tourists include convenient transportation to the community, public infrastructure convenience, and the availability of ATMs. Following are distinctive and diverse activities focusing on community participation in small groups.

From the evaluation of creative tourism resources in all aspects, it was found that the tourism resources are highly ready, with an average score of 4.04. This suggests a high possibility of development into creative tourism destinations and can serve as a guideline for future area management to meet the standards of creative tourism.

The researcher organized the tourism routes by conducting a network analysis using Dijkstra's algorithm. This method solves the shortest path problem by considering both the distance

and travel time, in the QGIS software, resulting in the identification of travel routes from Baan Noi Rim Khlong Farm Stay to major tourist destinations or activity venues. Two groups were delineated: 1) 3-day, 2-night travel routes, and 2) 2-day, 1-night travel routes. Estimated costs per person for these routes are as follows: 1,950 baht per person for the 3-day, 2-night routes, and 1,200 baht per person for the 2-day, 1-night routes.

Discussions

From the collection of both secondary and primary data obtained through the application of geo-information technology for spatial surveys and the assessment of the tourism potential of the Baan Noi Rim Khlong community in Sa Kaeo Province through interviews with sample groups, the potential in various areas has been identified. These areas include tourism resources, tourists, marketing and business aspects, problems, and obstacles from the perspectives of stakeholders, community residents, and tourists.

Currently, Baan Noi Rim Khlong's tourist attractions receive attention from target groups, particularly tourists interested in community-based tourism and engaging in activities with residents. The area's natural resources support tourism and various creative activities while maintaining local customs and culture. The focus is on tourist participation in the community, offering high business growth opportunities due to social media and influencer trends, which have increased the visibility and number of visitors to community attractions and accommodations. The Subdistrict Administrative Organization has also taken an active role in spatial development by creating floating market activities and promoting various events to generate income for the community and develop it into a creative tourism destination. However, the main challenges in Baan Noi Rim Khlong include a lack of budget for community development, such as improving tourist attractions and village lighting. Additionally, the community's products lack online sales channels. Despite the increase in tourists, there are still few homestay businesses, necessitating knowledge development and encouraging community members to recognize the importance of homestay businesses to accommodate tourists, thereby increasing income and achieving sustainability in the community. Furthermore, previously, tour operators and homestay owners set tourism routes themselves, which did not fully meet customer needs. Therefore, in this study, the researcher surveyed tourists about their interests in attractions and activities to use this information as a guideline for creating tourism routes.

Additionally, the evaluation of creative tourism resources for development into creative tourism, conducted by experts, revealed that the creative tourism resources are highly ready. The average score was 4.04, indicating a high possibility for development into a creative tourism destination. This result suggests that, overall, there is a strong potential for developing creative tourism, and it can serve as a guideline for managing and planning the area to meet the standards for creative tourism in the future which aligns with the research conducted by Patarporn Iamviriyawat, to develop strategies to elevate the community to creative tourism of Hot Spring Village, Dan Chang District, Suphan Buri Province. The study involved examining basic data and the creative tourism resource potential of the Hot Spring Village community. A draft proposal for strategies to enhance creative tourism was formulated. The research findings indicate that tourism-related organizations and agencies can utilize the gathered data to benefit the community and serve as a model for other communities in developing creative tourism destinations (Iamviriyawat, 2018). This aligns with the works of Khopolklang and Kaewsanga to explore the development guidelines for promoting creative tourism in Chiang Khan District, Loei Province. The study examined the satisfaction and preferences of tourists who visited the area, the local potential for promoting creative tourism, the roles and responsibilities of the locality in promoting creative tourism, existing challenges and obstacles, and future development directions. The research findings revealed insights into tourist behaviors, satisfaction levels, and preferences across various aspects, as well as the roles and responsibilities of the locality in becoming a hub for creative tourism. It also sheds light on the management of local agencies to drive Chiang Khan District, Loei Province towards becoming a creative tourism destination (Khopolklang & Kaewsanga, 2017).

Recommendations

The results of the network analysis for organizing tourism routes should be used to further develop a tourism recommendation system.

Body of Knowledge

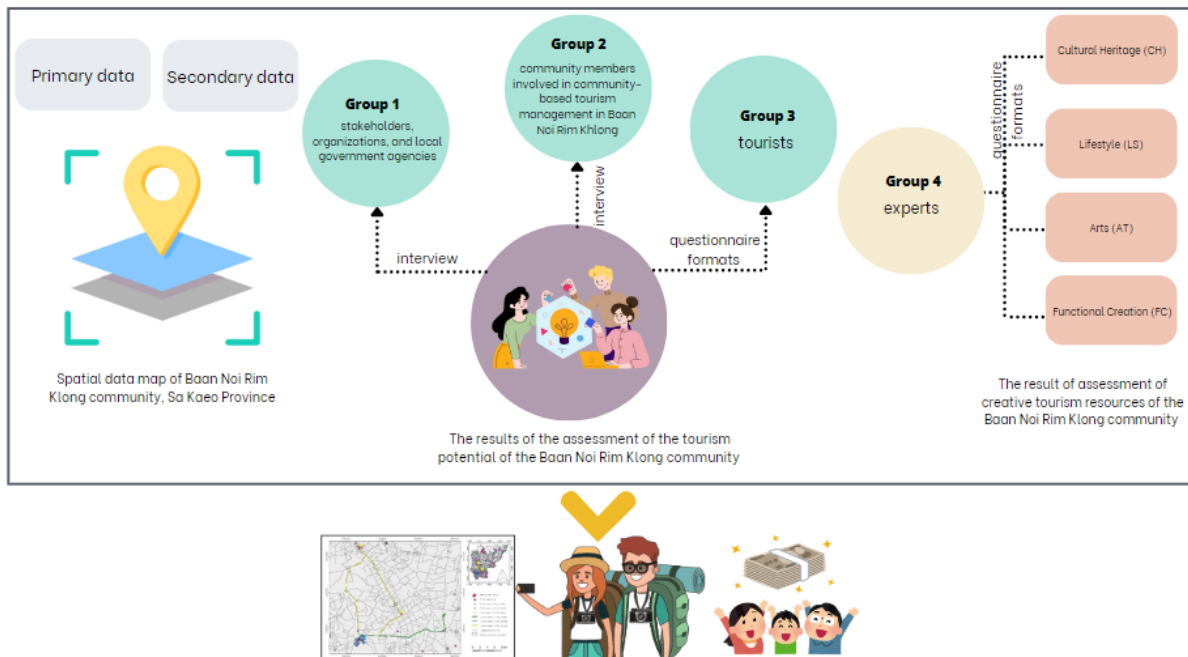


Figure 14 Body of Knowledge

The researcher has applied geo-information technology for spatial surveys and data mapping. This aims to assess the tourism resource potential of the Baan Noi Rim Khlong community in Sa Kaeo Province. Data were collected from stakeholders, agencies, local administrative organizations, community residents, and tourists to study the potential, problems, and obstacles, as well as the development guidelines for the tourism resources of the Baan Noi Rim Khlong community. The goal is to develop it into a creative tourism destination. The potential of creative tourism resources was assessed by experts, and the evaluation criteria were divided into four groups: 1) Cultural heritage, 2) Way of life, 3) Arts, and 4) Products that meet different needs according to the criteria of the Tourism Authority of Thailand, 2013. Then, a network analysis was conducted to create tourism routes.

The outputs of this research are: 1) spatial data: spatial data for the Baan Noi Rim Khlong community, 2) tourism resource assessment: evaluation of the current tourism resource potential in the Baan Noi Rim Khlong community, 3) feasibility assessment: evaluation of the feasibility of developing creative tourism resources, 4) Tourism Routes: Design and analysis of tourism routes, and 5) Participant Satisfaction: Results from the satisfaction assessment of participants in online training. The outcomes of the research include: 1) development planning: villagers can use the data

and insights for planning future development potential, 2) resource awareness: the community gains awareness of local resources and can leverage this to promote tourism and generate income, 3) stakeholder utilization: stakeholders can utilize the data to contribute to and enhance tourism development planning within the community. The impact of the research includes: 1) academic contributions; the research findings will contribute academically to the field of tourism and provide valuable knowledge that can be disseminated to the community, facilitating further practical applications; 2) community awareness: the research increases the community's awareness of the importance of local resources and culture, fostering collaborative efforts to sustainably conserve these assets; and 3) tourist and income growth: there is an observed increase in tourist numbers and income, as illustrated in Figure 14.

References

- Arikul, P. (2017). *Handbook of geographic information systems, remote sensing techniques, and GPS surveying for use in smart farm management planning according to the Thailand 4.0 policy*. National Research Council of Thailand (NRCT).
- Arpomongkolrat, N., & Poolsawat, P. (2017). *Travel planning system in Samutprakarn with Dijkstra's algorithm*. In a Paper presented at the 5th Academic Science and Technology Conference, (1476–1483).
- Aunphoklang, W. (2012). *Sugarcane transportation management Using network and multi-objective Decision analyses*[Master's thesis, Suranaree University of Technology].
- Aunphoklang, W., & Sangphong, O. (2023). *Training document: Network analysis with geographic information system data management software*. New Graduate Project.
- Department of Tourism, Ministry of Tourism & Sports. (2017). *Creative Tourism Management Handbook*. <https://www.dot.go.th/news/internal-audit-plan/detail/3052/8>
- GISTDA: Geo-Informatics and Space Technology Development Agency (Public Organization). (2009). *Handbook of space technology and geo-informatics*. Amarin.
- Hunwisai, D. (2022). Dijkstra's algorithm for solving the fuzzy shortest path problem on networks under trapezoidal fuzzy number. *UTK Research Journal*, 16(1), 30–41. <https://ph02.tci-thaijo.org/index.php/rmutk/article/view/246441>

- Iamchuen, N., Anucharn, T., & Jussapalo, C. (2022). Enhancement of secondary-city tourism in Phatthalung province towards value creation using augmented reality technology. *BUSCII*, 27(1), 101–119. <https://scijournal.buu.ac.th/index.php/sci/article/view/3988>
- Iamviriyawat, P. (2018). *Strategy development for community elevation to creative tourism of Banphunamron Danchang district, Suphanburi province Thailand*[Doctoral Dissertation, Silpakorn University].
- Khopolklang, N., & Kaewsanga, K. (2017). *Local development guidelines for promoting creative tourism in Chiang Khan district, Loei province*(Research report). Suranaree University of Technology.
- Kitwinit, S., Kaewfai, J., Hama, S., Dayi, D., Waranantakul, W., Poomkaew, S., & Maro, K. (2019). *A study of creative tourism resources in the tourism community of Lidon sub-district, Mueang district, Yala province*(Research Report). Yala Rajabhat University.
- Langkulkasattrin, W., & Akasuwan, N. (2018). *Applied geographic information system to support by community tourism: A case study of Kohyor, Songkhla*. In a Paper presented at the 1st National Conference on Humanities and Social Sciences, Songkhla Rajabhat University, Thailand, (521–530).
- Meepong, T. (2022). Community enterprise entrepreneurs in Baan Noi Rim Khlong homestay farm. *Personal communication*, April 9, 2022.
- Ministry of Tourism and Sports. (2022). *Domestic tourist statistics within the country Q1–Q4 2022 (Eastern region)*. <https://www.mots.go.th/news/category/766>
- Phuthong, P., Jaroenjit, J., & Zhou, N. (2016). *Geographic information system for natural attraction in Klong Sok Sub-district, Phanom district, Surat Thani province*. In Paper presented at the 7th Hatyai National and International Conference, Hatyai University, Thailand. (1437–1448).
- Richards, G., & Raymond, C. (2000). Creative tourism. *ATLAS News*, 23, 16–20. https://www.academia.edu/1785786/Creative_Tourism_Richards_and_Raymond_2000
- Suwanvijit, W. (2018). Create tourism activities for elderly tourists in the basin community of Khlong Pa Payom–Khlong Ta Nae, Phatthalung province. *Area Based Development Research Journal*, 10(6), 514–528. <https://so01.tci-thaijo.org/index.php/abcjournal/article/view/156256>
-

- Thai Tourism. (2013). Creative tourism. In Pleerux, N., Anuraksakornkul, P., & Pongsangiam, T. (2016). *Creative tourism in the Eastern Areas* (Research report), Burapha University.
- Verbyla, L.D. (2002). *Practical GIS analysis*. Taylor & Francis.
- Witheetrairong, Y. (2019). *Fundamental knowledge of geographic information systems*. Department of Geography, Faculty of Arts, Silpakorn University.