



URBAN MAPPING FOR SPATIAL KNOWLEDGE: SPATIAL BUILDING CONFIGURATION IN BAGANSIAPIAPI – A PRELIMINARY STUDY

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Abstract: Despite its rich cultural heritage and significance as a tourism destination, there has been little research on Bagansiapiapi's spatial characteristics. Such studies could offer valuable insights for improving urban planning, especially in enhancing its potential as a tourist-friendly city. Urban mapping is a way to understand complex built environments through spatial representation. It offers new perspectives for observing, planning, and designing cities. This article examines urban mapping in Bagansiapiapi, a cultural tourism destination in Riau, Indonesia. A qualitative method with a case study approach is employed to collect data, including observations and documentation. The collected information is processed using Building Information Modelling (BIM) and graphic applications. This study aims to reveal spatial configuration along Jalan Perniagaan, contributing to a better understanding of its urban form and potential for development. These findings are expected to support strategies for preserving cultural heritage and improving urban spaces in Bagansiapiapi.

INTRODUCTION

Bagansiapiapi, the capital of Rokan Hilir Regency in Riau Province, Indonesia, is located at the mouth of the Rokan River and has significant tourism potential. One of its main attractions is the Bakar Tongkang Festival, a cultural tradition held annually on the 16th day of the fifth month of the Lunar calendar. Another highlight is the city's Chinatown, featuring Chinese-Malay architecture that reflects Bagansiapiapi's unique identity and image (Imanda et al., 2019).



Both the festival and Chinatown are centered along Jalan Perniagaan, a north-south commercial street that plays a pivotal role in Bagansiapiapi's heritage. This street is part of the Bagan Heritage Tour, an event organized by the local government to raise awareness about the city's cultural heritage by showcasing historical sites. Jalan Perniagaan is notable for its historical buildings, including shops and houses that date back to the 1920s.

However, Bagansiapiapi's rapid economic development poses a risk to its cultural identity and the preservation of its heritage sites (Asriana & Sesotyaningtyas, 2018; Imanda et al., 2019). Addressing these challenges requires strategies that not only conserve historical values but also envision sustainable growth (Azizi et al., 2016; Cunningham, 2013). One promising approach is urban mapping, which, according to Dovey & Ristic (2017), offers a powerful tool for producing spatial knowledge and understanding urban dynamics. Through diagrams and other methods, urban mapping highlights the connections between how cities are experienced and planned, enabling innovative strategies for both preservation and development.

Previous studies have focused primarily on Bagansiapiapi's architectural aspects (Faisal & Firzal, 2020; Imanda et al., 2019), with limited discussion of its urban space (Repi, 2014). This article uses urban mapping to better understand the spatial characteristics of Bagansiapiapi. The research aims to provide foundational knowledge for developing Bagansiapiapi as a tourism-oriented city.

RESEARCH METHODS

This study used a qualitative method with a case study approach. Data collection techniques included observation, photography, and videography. Primary data was collected over two days, from September 28–29, 2024. The purpose was to directly observe and experience the city's spaces. Photographs and videos were taken to document the current conditions of the studied area.

The documentation was utilized to create a map of the current state of Jalan Perniagaan. Digital mapping was then conducted to represent the existing conditions of the area. This process used Building Information Modelling (BIM) to create a digital model of the site. BIM is widely used to create virtual models, particularly in historical areas (Bianchini & Potestà, 2021). Afterward, the BIM data was refined using graphic software, such as Adobe Photoshop.

To analyze the area's existing conditions, we applied an approach from Dovey et al. (2017), adapted from Hoek (2008). This method categorizes urban functions into three primary groups: "live," "work," and "visit," represented by the primary colors red, blue, and green,

respectively. "Live" refers to residential or accommodation areas, such as homes and hotels. "Work" includes places like schools, offices, and factories. Lastly, "visit" covers locations like places of worship, shops, hospitals, restaurants, and museums. Mixed functions are represented by secondary colors: yellow for live/visit, magenta for live/work, and cyan for work/visit. White represents areas combining all three categories. This approach has been applied in various studies to map urban spaces based on their functions (Duric, 2017; Khan et al., 2023).

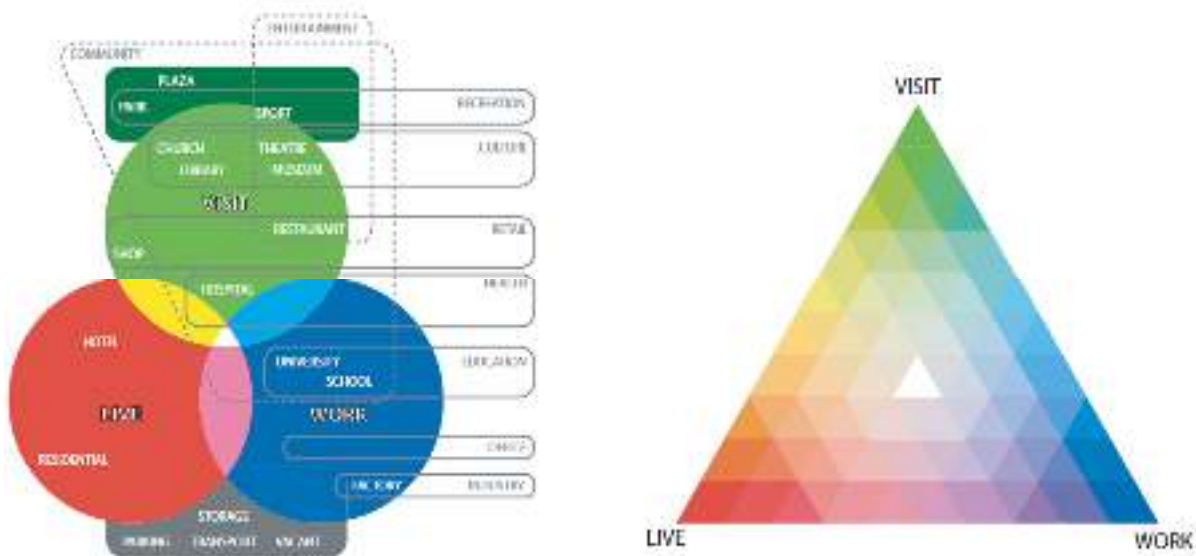


Figure 1. Live/work/visit triangle (Dovey et al., 2017, p. 26)

STUDY AREA

Repi (2014) explains that the name Bagansiapiapi has two possible origins. According to the first version, the name comes from the Malay language, combining the words *bagan* and *apiapi*. *Bagan* means a place or region, while *apiapi* refers to mangrove trees commonly found at the mouth of the Rokan River. The second version suggests that the name originates from Chinese settlers, who make up the majority population in Bagansiapiapi. According to their account, Chinese migrants traveling from their homeland once saw a fire on land in the Rokan area. The fire was said to come from the remains of bonfires used by local fishermen staying overnight in temporary shelters to dry their catch. Thus, the area became known as Bagansiapiapi.

Since their arrival in the early 19th century, Chinese migrants have contributed significantly to the development of Bagansiapiapi. Initially, they joined local fishermen in fishing and trade activities. Over time, they settled along the Rokan River, building a community with Chinese-style architecture. This settlement encouraged further migration from China, leading to the establishment of a thriving community. The migrants helped develop the

town by constructing markets, places of worship, educational institutions, and other facilities needed by the community.



Figure 2. Old map of Bagansiapiapi

To celebrate the arrival of the Chinese community in the Riau region, they hold a traditional event called *Bakar Tongkang*, where *bakar* means "burn" and *tongkang* refers to "the ship." This event involves burning a replica of a ship, accompanied by prayer rituals conducted by the Chinese community (Melisa & Rianto, 2021). The festival is a significant part of Indonesia's tourism calendar. According to local authorities, around 50,000 tourists attend this event, with hotel occupancy reaching 1,800 rooms during the festival (Heru, 2024).

The Bakar Tongkang Festival, one of the main tourist attractions in Bagansiapiapi, is held on Jalan Perniagaan. According to Rangkuty (2019), this street was historically a residential area featuring traditional Chinese-Malay-style houses. The blend of these architectural styles is evident in the materials and decorative elements of the buildings. Some structures still retain their traditional characteristics, such as stilt-house designs made of wood.

Jalan Perniagaan is in relatively good condition, with few visible potholes. The road width ranges between 8–9 meters, and the buildings along it vary from 1 to 4 stories high. However, most structures are 1–2 stories, allowing for clear views of the sky. There are currently no dedicated pedestrian pathways on this street, as most residents rely on private vehicles such as cars, motorcycles, or electric bikes. Consequently, pedestrians walk along the roadside, sharing space with motorized traffic.



Figure 3. Existing condition in Jalan Perniagaan

RESULTS AND DISCUSSION

The rapid development of Bagansiapiapi has led to significant economic-oriented transformations along Jalan Perniagaan. These changes include alterations in building functions, renovations, and incidents like fires. Some residential buildings have expanded their purposes, incorporating commercial or religious uses. For instance, many homeowners have added businesses to their houses, while others have converted them into prayer halls. Architecturally, several structures have been renovated using brick materials, increasing their height to up to four stories.

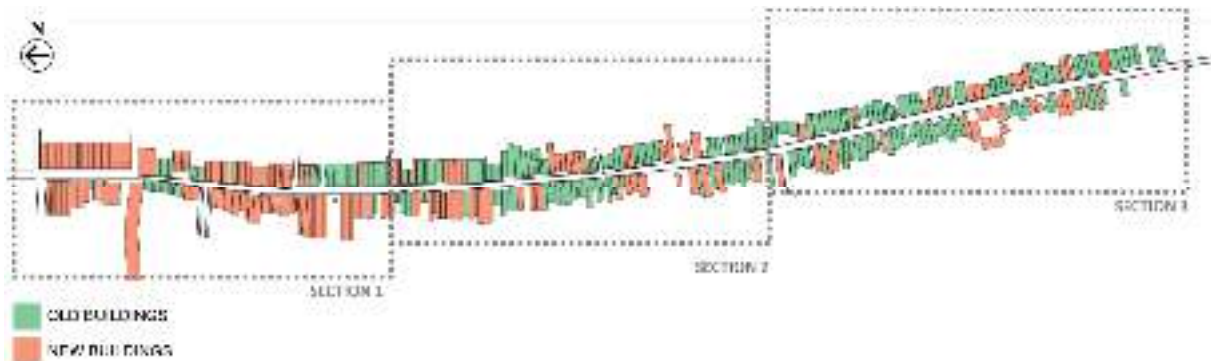


Figure 4. Mapping the old and new buildings



(a)

(b)

Figure 5. (a) new buildings; (b) old buildings

The map on Figure 4 uses the live/work/visit triangle method (Dovey et al., 2017) to analyze building functions. Section 1 is dominated by yellow, representing live/visit activities. This is due to the prevalence of shophouses, which combine residential (live) and commercial (visit) uses (Aranha, 2013). Typically, these shophouses have two to five floors, with the ground floor used as a shop and the upper floors as residences. These shops range from eateries and grocery stores to workshops and clothing outlets. Traditional two-story wooden shophouses also exist in this area, with some consisting of more than five units under one roof.

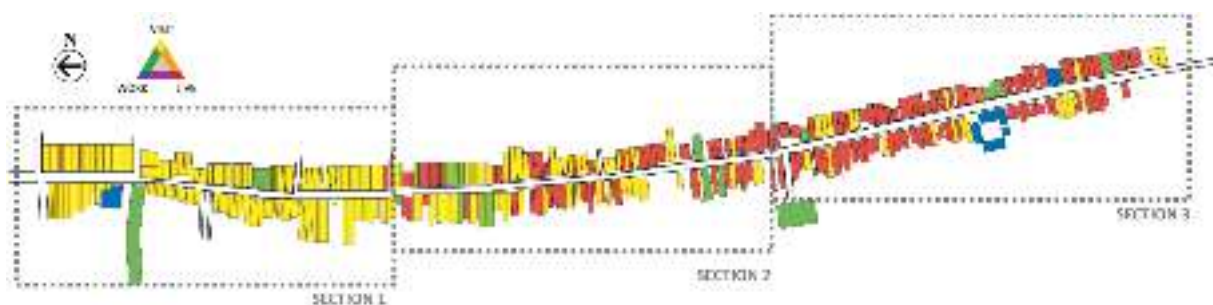


Figure 4. Mapping functional mix in Jalan Perniagaan



Figure 5. Traditional shophouses (a) five units under one roof; (b) three units under one roof

Section 2 shows a mix of live (red), visit (green), and live/visit (yellow) functions, with no work-related (blue) buildings. Traditional Chinese-Malay houses are prevalent here, often one or one-and-a-half stories high (Rangkuty, 2019). Most of these houses have front terraces that face the street, providing opportunities for small businesses. As a result, some homeowners have converted their terraces into spaces for commercial activities, such as food stalls, convenience stores, or shops selling religious items and other goods. Visit functions (green) include shophouses and religious spaces, such as Buddhist temples (*kelenteng*), which share similar purposes with churches in Dovey's framework.



Figure 6. One of Buddhist temple

Section 3 is mainly residential (red), with some traditional houses still present. This area includes work-related buildings such as a public elementary school and a journalism office. It also features the site for the Bakar Tongkang festival, a key tourism attraction in Bagansiapiapi.



Figure 6. The location of Bakar Tongkang Festival

In Jalan Perniagaan, the mapping shows a clear pattern. Moving southward, buildings generally serve single, specific purposes, such as residential or institutional use. The southern areas gradually turn into Malay settlements, which reflect their cultural identity. On the other hand, the northern sections have many mixed-use buildings, especially shophouses. These buildings are common in Chinese communities because they combine living and business spaces, making them practical (Aranha, 2013; Rangkuty, 2022). There are more shophouses in the northern area because it connects to Jalan Perdagangan, a nearby trade area that boosts its economy. By showing these patterns, urban mapping helps link planning and design, providing a useful guide for future city development.

This mapping exercise highlights the layout and functions of the city and their potential for improvement. Urban mapping, as explained by Dovey and Ristic (2017), focuses on improving city spaces by finding areas that can be transformed. This idea connects to the goal of sustainable urban tourism, where good environments are important for success (Zamfir & Corbos, 2015).

CONCLUSIONS AND RECOMMENDATIONS

This research provides a foundational understanding of the urban space in Bagansiapiapi. The spatial knowledge obtained through mapping can assist stakeholders, such as architects and urban planners, in better designing and planning the city (Dovey & Ristic,



2017). Maps not only document the physical form of the city but also help envision its future transformations.

However, as Pafka & Dovey (2017) note, maps alone cannot fully explain the relationship between urban morphology and everyday life. Future studies should include social and cultural aspects to uncover the reasoning behind Bagansiapiapi's spatial arrangement. Urban mapping, with its ability to integrate physical, social, and cultural dimensions, can facilitate such research.

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