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# KNOWLEDGE MANAGEMENT SYSTEM USING KNOWLEDGE SHARING FOR SUSTAINABLE BATAM TOURISM

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**Abstract:** The development of sustainable tourism in Batam City faces several challenges. Knowledge and information related to tourism remain scattered among various stakeholders, resulting in suboptimal coordination. Knowledge sharing and collaboration among stakeholders remain limited, so best practices and experiences have not been fully leveraged. A Knowledge Management System (KMS) based on knowledge sharing is needed to support information exchange and the development of sustainable tourism. The methodology used in this study is the Knowledge Management System Life Cycle (KMSLC) approach combined with Design Thinking. The research steps included an evaluation of the existing infrastructure, the formation of a knowledge management team, knowledge collection, the design of a KMS prototype, and the development of that prototype. The results of the study indicate that a knowledge-sharing-based Knowledge Management System (KMS) prototype was successfully developed to meet the needs of tourists and tourism stakeholders in Batam City. The system built is capable of facilitating the management, storage, and exchange of knowledge among stakeholders in a more integrated manner. The implementation of the KMS also enhances collaboration and supports the decision-making process in the development of tourism products and services. These findings indicate that a KMS can serve as an effective solution in supporting sustainable tourism development in Batam City.

**Keywords:** tourism, KMLC, Batam City, design thinking, knowledge management.

**Abstrak:** Pengembangan pariwisata berkelanjutan di Kota Batam menghadapi beberapa tantangan. Pengetahuan dan informasi terkait pariwisata masih tersebar di berbagai pemangku kepentingan sehingga koordinasi belum berjalan secara optimal. Berbagi pengetahuan dan kolaborasi antar pemangku kepentingan masih terbatas, sehingga pengalaman dan praktik terbaik belum dimanfaatkan secara maksimal. Diperlukan Sistem Manajemen Pengetahuan (KMS) berbasis knowledge sharing untuk mendukung pertukaran informasi dan pengembangan pariwisata berkelanjutan. Metodologi yang digunakan dalam penelitian ini adalah pendekatan Siklus Hidup Sistem Manajemen Pengetahuan (KMSLC) yang dikombinasikan dengan Design Thinking. Langkah-langkah penelitian mencakup evaluasi infrastruktur yang sudah ada, pembentukan tim manajemen pengetahuan, pengumpulan pengetahuan, perancangan prototipe KMS, serta pengembangan prototipe KMS tersebut. Hasil penelitian menunjukkan bahwa prototipe Knowledge Management System (KMS) berbasis knowledge sharing berhasil dikembangkan sesuai dengan kebutuhan wisatawan dan pemangku kepentingan pariwisata di Kota Batam. Sistem yang dibangun mampu memfasilitasi pengelolaan, penyimpanan, dan pertukaran pengetahuan antar pemangku kepentingan secara lebih terintegrasi. Implementasi KMS juga meningkatkan kolaborasi dan mendukung proses pengambilan keputusan dalam pengembangan produk dan layanan pariwisata. Temuan ini menunjukkan bahwa KMS dapat menjadi solusi yang efektif dalam mendukung pengembangan pariwisata yang berkelanjutan di Kota Batam.

**Kata *kunci*:** pariwisata, KMLC, Kota Batam, desain thinking, manajemen pengetahuan.

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## INTRODUCTION

Batam is a strategically located city in Indonesia, close to the Strait of Malacca, Singapore, and Malaysia [1]. This strategic location makes Batam a popular destination for both domestic and international tourists. According to BPS data, Batam recorded 3,082,823 tourist visits between 2020 and 2025. The city offers various attractions, including natural, historical, religious, and man-made tourism sites. These attractions contribute significantly to the growth potential of Batam's tourism sector [2].

Tourism is a crucial factor in helping Batam's economic progress [1], [2]. Despite its strong tourism potential, Batam has not fully optimized the economic benefits of its tourism sector. One reason is the lack of effective tourism information management and an integrated information system. As a result, tourism resources and opportunities are not utilized efficiently. This limits the sector's contribution to local economic growth and community income [1]. Most tourists visiting Batam stay for less than 24 hours and only visit shopping malls or other urban attractions. Meanwhile, many tourism destinations in suburban and rural areas remain underutilized despite their high potential. This is partly due to the lack of a platform that helps tourists discover attractions across the city. As a result, the economic benefits of tourism are not distributed evenly to local communities [1], [2], [3].

To tackle these issues, this research suggests creating a Knowledge Management System (KMS) that focuses on sharing knowledge. A KMS is meant to gather, arrange, save, and share information among various groups, including government bodies, tourism sectors, scholars, and local residents [2], [4]. By enhancing teamwork and information sharing, this system can aid in making decisions, planning tourism, fostering innovation, and promoting sustainable tourism growth in Batam City [2], [5].

This study uses the Knowledge Management Systems Life Cycle (KMSLC) approach along with design thinking strategies to understand what stakeholders need and to create an efficient tourism information system [6], [7]. The application of the KMS is anticipated to make tourism easier to access, draw in more visitors, boost the local economy, protect Malay cultural heritage, and improve the social and environmental standards of tourism sites in Batam [8], [9], [10]. Furthermore, this study adds to academic knowledge by combining information systems technology with tourism management.

## METHOD

This study applies a method that combines the Knowledge Management Systems Life Cycle (KMSLC) with design thinking principles to develop a useful and innovative Knowledge Management System (KMS) for supporting sustainable tourism development in Batam City [7]. Through several stages, including evaluating existing infrastructure, forming a knowledge management team, collecting and analyzing knowledge, and designing and refining the KMS prototype, this integrated approach aims to provide a comprehensive solution for improving collaboration, tourism management, and sustainable tourism growth in Batam City [8], [11].

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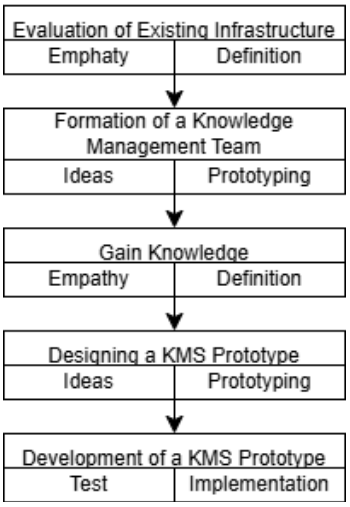

Image 1. Research Method

This study integrates the Knowledge Management Systems Life Cycle (KMSLC) with Design Thinking principles through several stages, including evaluating existing infrastructure, forming a knowledge management team, capturing knowledge, designing the KMS prototype, and developing the final system. The process begins with understanding stakeholder needs and identifying existing challenges, followed by collaborative brainstorming to strengthen the knowledge management team. Knowledge is then collected and analyzed to determine the information required by stakeholders, while iterative prototyping is used to design and refine the KMS based on user feedback. Finally, the prototype is tested and implemented to ensure that the developed system effectively meets user needs and supports sustainable tourism development in Batam City.

The research team will collect tourism data in Batam through interviews, surveys, and literature reviews involving key stakeholders [12], [13]. The collected data will be analyzed to assess the current state of Batam's tourism sector and stakeholder expectations. The findings will be used as the basis for developing a Knowledge Management System (KMS) to support information sharing and collaboration. The KMS prototype will be designed using UML with an object-oriented approach to model system-user interactions [10] . The system will be implemented as a web-based application accessible to tourism stakeholders in Batam City. The study also describes the data collection, sampling, analysis, and validation methods used to ensure the reliability and effectiveness of the research.

## RESULTS AND DISCUSSION

This section presents the research findings from data collection, analysis, system design, and KMS prototype implementation, based on the research methodology. The first stage of this study involves collecting data through surveys and interviews to evaluate Batam's tourism infrastructure. The surveys target tourists, tourism operators, and local communities, while the questionnaire is tested for validity and reliability using the Bivariate Pearson correlation method before distribution.

$$r_{xy} = \frac{n\sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{\sqrt{(n\sum_{i=1}^{n} x_i^2 - (\sum_{i}^{n} x_i)^2)(n\sum_{i=1}^{n} y_i^2 - (\sum_{i=1}^{n} y_i)^2)}}$$

Keterangan:
$r_{xy}$: koefisien korelasi antara var X dan var Y
$x_i$: nilai data $ke\text{-}i$ untuk kelompok variabel X
$y_i$: nilai data $ke\text{-}i$ untuk kelompok variabel Y
$n$: banyak data

Pengujian reliabilitas pada penelitian ini dilakukan dengan menggunakan uji Alpha Cronbach dengan persamaan sebagai berikut:

$$r_{11} = \left(\frac{n}{n-1}\right)\left(1 - \frac{\sum \sigma_t^2}{\sigma_t^2}\right)$$

Keterangan:

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$r_{11}$ : nilai reliabilitas yang dicari
$n$ : jumlah item pertanyaan yang diuji
$\sum \sigma_t^2$ : jumlah varians skor tiap item
$\sigma_t^2$ : varians total

Table I. Validity and Reliability Test Results

| **Case Processing Summary** | | | |
|---|---|---|---|
| | | N | % |
| Cases | Valid | 50 | 100,0 |
| | Excluded[a] | 0 | 0 |
| | Total | 50 | 100,0 |
| **Reliability Statistics** | | | |
| Cronbach's Alpha | | N of Items | |
| .476 | | 7 | |

The questionnaire was confirmed to be reliable with a Cronbach's Alpha value of 0.476, which exceeded the critical value of 0.279. It was then distributed to tourists at various destinations in Batam, and the collected data were analyzed using descriptive statistics to determine the percentage of each indicator. The percentage results for each indicator are presented in the frequency distribution table below. The most-visited tourist destinations in Batam are Beach Tourism (29%), Religious Tourism (28.3%), and Man-made Attractions (24.3%). Tourists mainly obtain information from social media (35.3%), followed by relatives (27.8%) and websites (12%). In terms of accessibility, 85.5% of tourists reported that access to tourist destinations was easy. Regarding service quality, 48.5% of respondents rated it as "very good," while 45.8% rated it as "good."

To gain deeper insights, interviews were conducted with key stakeholders, including tourism authorities, tourism operators, and academics. The interview findings were combined with the survey results to develop a knowledge management framework for Batam's tourism sector.

The next stage is forming a knowledge management team to manage and organize the knowledge collected from surveys and interviews. This knowledge is then transformed into solutions to support tourism development in Batam City through the ideation and prototyping process.

Capturing Knowledge involves analyzing the collected data and categorizing it into several assessment areas for further evaluation.

Batam has generally provided good tourism services. However, tourism stakeholders still lack a centralized platform for accessing and sharing tourism information. As a result, tourists mainly rely on social media to obtain information about attractions and events. Therefore, a system is needed to manage tourism information and capture visitors' experiences in Batam City.

Based on the conclusions above, the research team designed a knowledge concept as shown in the image below.

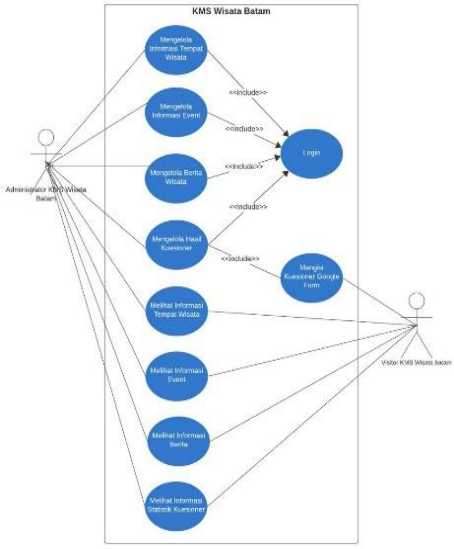


Image 2. Concept of the Tourism Management System

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Designing a KMS Prototype involves creating a UML-based system design using insights from the analysis phase to support Batam's tourism development.

The proposed KMS helps tourists find attractions and share travel experiences in Batam. It also supports tourism operators in promoting destinations and assists local governments in tourism planning and decision-making.

The KMS prototype includes several features, namely a tourism information section, tourism survey section, tourism events section, tourism infographics section, and tourism news section for Batam City.

Users can access tourism information, tourism news, tourism events, and submit their travel experiences in Batam through a Google Form. Administrator manages and processes data submitted by tourism stakeholders in Batam.

Data from tourism stakeholders and administrators is stored and managed within the KMS application.

The completed prototype was implemented as a Laravel-based web application accessible to all tourism stakeholders, as shown in the following image.

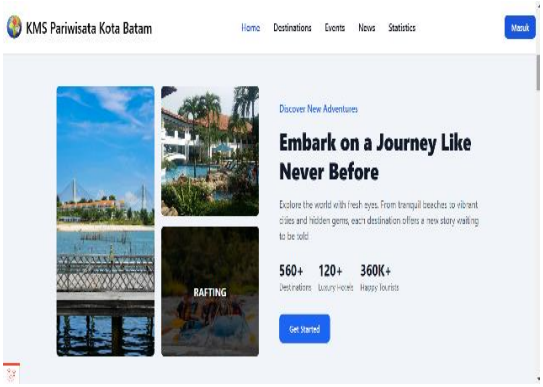


Image 3. KMS App Home Screen.

The main menu displays tourist destinations, tourism news, infographics, and upcoming events in Batam City. One of its features is the Tourist Destinations menu, which provides information about various tourist attractions in Batam.

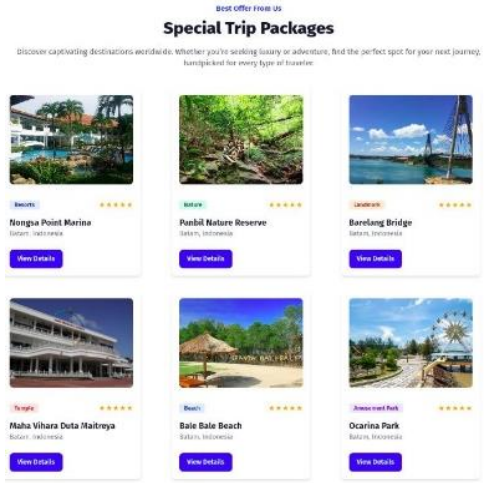


Image 4. The "Tourism Info" Feature of the KMS App.

Chatbot Feature This feature allows tourists to provide brief feedback directly about the tourist attractions they have visited. The interface for this feature is shown in the following image.

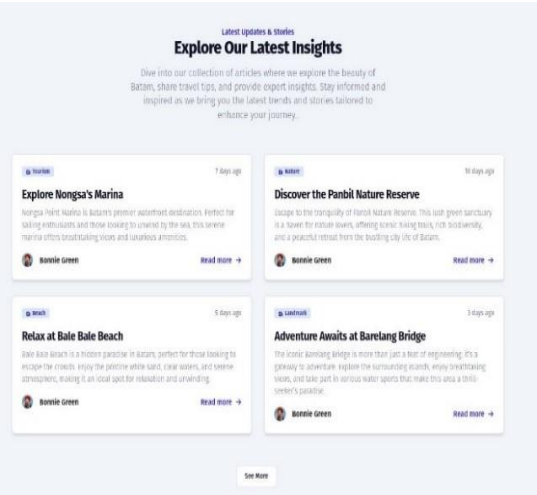


Image 5. Chatbot Feature of the KMS App.

In addition to the Chatbot feature, there is also an infographics feature that

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anyone who accesses the app can view to see the current state of tourism in Batam. This feature is shown in the following image.


Image 6. Infographic Features of the KMS App.

The application was developed based on collected data and analysis results to provide tourism information that can be accessed and utilized by all tourism stakeholders in Batam City.

System Evaluation. After the KMS application was developed, it was tested by 50 respondents from various backgrounds, particularly those involved in the tourism sector. The evaluation measured the system's functionality, compatibility, reliability, and security using descriptive statistical methods.

The results showed that 72% of respondents considered the system to function well and 22% fairly well. In terms of compatibility, 58% found the system very easy to use and 26% easy to use. Regarding reliability, 98% of respondents stated that the system was very necessary, while only 2% considered it unnecessary.

In terms of security, 90% of respondents believed that the system was safe to use. These findings also helped identify areas for future improvement.

## CONCLUSION

This study developed a Knowledge Management System (KMS) to support information sharing and collaboration among tourism stakeholders in Batam City. By combining the KMSLC and Design Thinking approaches, the research identified stakeholder needs, designed a KMS prototype, and implemented it as a Laravel-based web application. The system includes features such as tourism information, news, events, infographics, and visitor experience surveys.

The evaluation involved 50 respondents and showed positive results. Most respondents stated that the system functioned well, was easy to use, necessary for tourism information management, and safe to use. These findings indicate that the KMS can effectively support tourism information sharing and collaboration among stakeholders in Batam.

This research contributes to sustainable tourism development by providing a centralized platform for tourism knowledge management. Future studies can enhance the system by integrating artificial intelligence, recommendation features, and advanced data analytics, as well as involving more respondents to evaluate its long-term impact.

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