

Implementation of Rapid Application Development (RAD) for Community-based Ecotourism Monitoring System

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Abstract—One of the challenges of tourism development in North Halmahera Regency is integrating technology in decision-making to determine leading and priority tourist destinations. Thematically, the ecology-based tourism development approach is the concept of ecotourism that balances environmental sustainability with tourism economic growth; however, tourism databases and information systems need to be developed by considering economic, socio-cultural, and environmental distribution and growth. This research adopts the Rapid Application Development (RAD) method in designing the Community-based Ecotourism Monitoring System. The stages in the RAD method consist of requirements planning, user interface design, construction, and cutover stages. At the requirement planning stage, this system will accommodate three main aspects: local attraction, local transportation, and local accommodation. A local attraction focuses on ecotourism development approaches, while local transportation refers to local transportation services managed individually or community-based. In addition, local accommodation refers to the business of homestay accommodation services as a form of community participation in tourism activities. At the construction stage, the instrument used in designing this system database is oracle-apex, which utilizes map, classic report, and form (modal dialog) features. Features and functions are tested at the cutover stage, and access rights restrictions are provided based on administrator, user, and viewer roles. The system design results show that policymakers must support community involvement in each tourist destination in determining priority areas for ecotourism infrastructure development. The testing result shows that all the features and operators are thriving and ready to be used. Thus, implementing RAD in the design of a community-based ecotourism monitoring system can be adapted to the context of ecotourism in North Halmahera Regency, North Maluku Province, Indonesia.

Keywords: Ecotourism; Community; Accessibility; Accommodation; RAD

1. INTRODUCTION

Ecotourism databases and management systems are pivotal in monitoring tourism development in rural areas. The primary objective of these systems is to collect, organize, and analyze data about ecotourism activities, ensuring effective management and sustainable practices [1]. By centralizing information on visitor numbers, environmental impact assessments, and community engagement, the database facilitates evidence-based decision-making for local authorities and stakeholders [2]. Implementing such a system enables real-time monitoring of ecotourism trends, allowing for proactive measures to be taken in response to emerging challenges [3]. Integrating technology in ecotourism management enhances efficiency and contributes to conserving natural resources and preserving cultural heritage [4]. In conclusion, establishing an Ecotourism database and management system is imperative for fostering responsible tourism practices and ensuring the long-term viability of rural areas as sustainable ecotourism destinations.

Implementing community-based ecotourism in rural areas necessitates the support of digital technology for the comprehensive monitoring of tourism activities, the forms and levels of local community participation, and the existing environmental conditions surrounding the tourism area [5]. By employing digital tools, such as databases and management systems, authorities can systematically collect and analyze data related to tourist visits, ensuring a nuanced understanding of the impact on the environment and the local community [6]. Integrating technology is paramount for achieving sustainable and responsible tourism practices [7]. It facilitates real-time tracking of tourism dynamics and empowers local communities to engage in decision-making actively, fostering a sense of ownership and promoting the preservation of their cultural and natural heritage [8]. In conclusion, the synergy between community-based ecotourism and digital technology presents a crucial framework for achieving a harmonious balance between tourism development, community involvement, and environmental conservation in rural areas.

The significance of technology in optimizing community-based ecotourism is undeniable. At its core, community-based ecotourism seeks to intertwine tourism development with the empowerment and engagement of local communities, fostering sustainable practices [9]. In this context, advanced technological solutions, such as digital databases and monitoring systems, emerge as indispensable tools for effective management and informed decision-making [10]. Technology enables the meticulous tracking of visitor patterns, environmental impacts, and community participation, offering valuable insights for stakeholders and authorities [11]. Integrating technology enhances the efficiency of ecotourism initiatives [12]. It provides a platform for local communities to contribute actively to the planning and management processes, ensuring their cultural and environmental interests are



safeguarded [13]. In conclusion, technology catalyzes the success of community-based ecotourism, offering a dynamic framework that harmonizes tourism development with community involvement and environmental conservation.

Community-based ecotourism in Indonesia encounters various challenges that impede its seamless implementation and success. The primary challenge lies in balancing tourist influx and preserving local cultural and environmental integrity [14]. The surge in visitor numbers often threatens rural communities' fragile ecosystems and traditional ways of life [15]. Furthermore, issues related to infrastructure, inadequate community participation, and limited access to technology hinder effective management and monitoring [16]. These challenges require a comprehensive and collaborative approach involving government bodies, local communities, and private sectors [17]. Sustainable solutions should be implemented to mitigate the environmental impact, and initiatives that promote community engagement and empowerment should be prioritized [18]. In conclusion, overcoming the challenges of community-based ecotourism in Indonesia necessitates concerted efforts to strike a harmonious balance between tourism development, cultural preservation, and environmental conservation.

Community-based ecotourism in rural areas encounters many challenges that complicate its successful implementation and sustainability. The primary challenge lies in striking a delicate equilibrium between fostering tourism development and preserving the authenticity of local cultures and environments [19]. The influx of tourists may inadvertently contribute to cultural dilution and place undue stress on fragile ecosystems [20]. Moreover, rural areas often grapple with limited infrastructure, resource access, and technological disparities, hindering efficient management and monitoring [21]. Addressing these challenges necessitates a holistic and collaborative approach involving local communities, governmental bodies, and private enterprises [22]. Implementing sustainable practices, empowering local communities, and fostering responsible tourism behaviors are imperative to mitigate adverse impacts [23]. In conclusion, overcoming the challenges of community-based ecotourism in rural areas demands a comprehensive strategy that aligns economic development with cultural preservation and environmental conservation.

This research focuses on designing a management system to optimize community-based ecotourism practices in rural areas, with a specific case study conducted in North Halmahera Regency. The primary objective is to develop a comprehensive framework that enhances the effectiveness of community-based ecotourism initiatives by leveraging insights from the local context [24]. The study aims to identify specific challenges and opportunities unique to the region through an in-depth examination of the North Halmahera, encompassing cultural dynamics, environmental conditions, and community involvement. Tailoring the management system to the specific needs and characteristics of the community is pivotal for ensuring the sustainability and success of ecotourism endeavors. In conclusion, this research contributes valuable insights that can inform the development of targeted strategies and policies, fostering a harmonious integration of community-based ecotourism in rural areas, as exemplified by the North Halmahera case study.

This research delineates its scope by adopting the Rapid Application Development (RAD) approach as the framework for designing the database and system tailored to meet user requirements. The primary focus lies in expediting the development process and ensuring flexibility to accommodate dynamic user needs. RAD methodology allows for iterative prototyping, fostering continuous user involvement and feedback incorporation throughout the system development life cycle. Embracing RAD offers advantages in terms of adaptability and responsiveness to user preferences, particularly crucial in database and system design where user requirements may evolve. In conclusion, by employing the RAD approach, this research aims to overcome potential limitations and create a more user-centric and agile database and system for optimal functionality and user satisfaction.

The visible urgency of this research lies in addressing a critical gap in current knowledge and practical applications. The primary motivation stems from the evident lacuna in existing research that has not comprehensively explored or implemented specific strategies for integrating community-based ecotourism data within the context of rural areas. Supportively, as global attention increasingly turns towards sustainable and community-centric tourism, the need for practical solutions and insights to inform effective management and development becomes more pressing. The urgency of this research is underscored by its potential impact on shaping policies, practices, and technologies that are integral to the sustainable growth of community-based ecotourism, particularly in rural settings. In conclusion, the visible urgency of this research is embedded in its potential to bridge knowledge gaps and offer actionable insights to propel the advancement of community-based ecotourism practices in rural areas.

2. RESEARCH METHODOLOGY

2.1 Rapid Application Development (RAD)

Rapid Application Development (RAD) is a methodology in software development that emphasizes rapid prototyping and iterative feedback to expedite the creation of high-quality applications. The primary tenet of RAD lies in its ability to swiftly adapt to changing requirements by involving end-users throughout the development process. The approach facilitates collaboration between developers and users, fostering a dynamic and responsive development environment. The strength of RAD lies in its iterative nature, which enables continuous refinement

based on user feedback, ultimately leading to the production of software that more closely aligns with user needs. In conclusion, the RAD methodology is a pragmatic and flexible approach to software development, promoting efficiency and user satisfaction by emphasizing quick iterations and stakeholder involvement.

The stages of Rapid Application Development (RAD) play a crucial role in the design of a Community-Based Ecotourism Management System. The main thrust of RAD involves iterative cycles, beginning with requirements planning and quickly progressing through the stages of user design, construction, and testing. In these successive phases, developers work closely with end-users to rapidly prototype and refine the application, ensuring that it aligns with the specific needs of the community-based ecotourism context. The iterative nature of RAD is particularly advantageous in the dynamic ecotourism landscape, allowing for prompt adjustments based on user feedback and emerging requirements. In conclusion, the structured progression of RAD stages offers a systematic and responsive approach, instrumental in developing a practical and tailored Community-Based Ecotourism Management System.

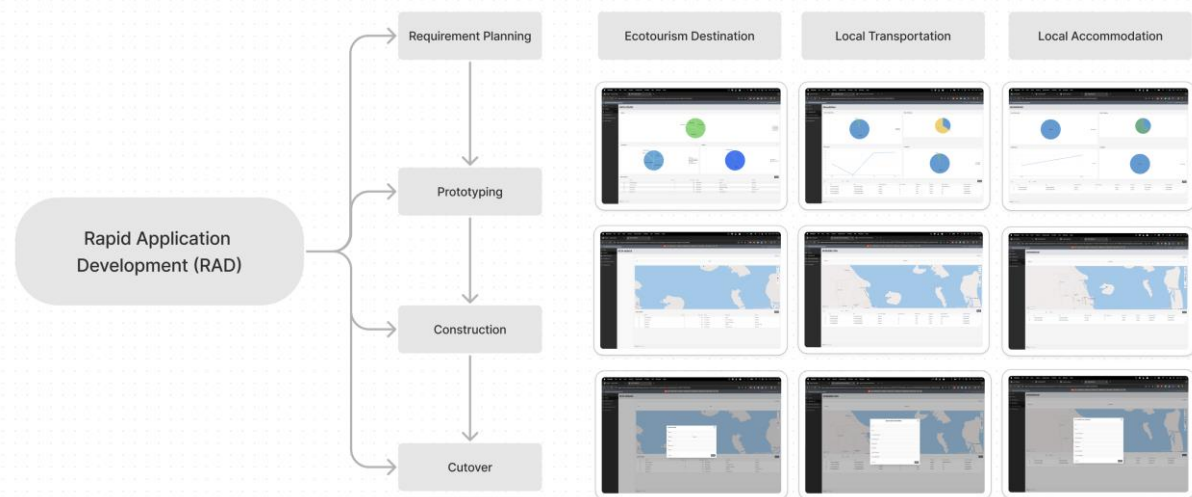


Figure 1. Rapid Application Development (RAD)

Figure 1 shows the implementation of RAD in ecotourism database and information system design using oracle-apex. In establishing a comprehensive database management and ecotourism monitoring system in North Halmahera Regency, three essential components are local attraction, transportation, and accommodation. The central focus is on local attractions, highlighting the unique natural and cultural features that draw tourists to the region. Supportively, local transportation infrastructure is critical for facilitating seamless travel to and within the area, ensuring accessibility for visitors. Furthermore, providing suitable local accommodation is imperative for enhancing the tourism experience. The integration of these three components forms the bedrock for a robust ecotourism management system, fostering sustainable tourism practices and contributing to the economic and cultural vitality of North Halmahera Regency. In conclusion, a well-structured database incorporating local attractions, transportation, and accommodation is fundamental for effectively monitoring and managing ecotourism in the region, as shown in the table below.

2.1.1 Requirements Planning

The requirement planning phase in the Rapid Application Development (RAD) method is grounded in the outcomes of identifying user application needs. The primary focus is on understanding and documenting user requirements comprehensively during the initial stages of RAD, laying the foundation for subsequent development processes. This phase involves interactive sessions and constant feedback loops between developers and end-users to ensure that the identified requirements align with the actual needs and expectations of the application's users. The emphasis on user involvement and continuous refinement during requirement planning contributes to the agility and responsiveness of RAD, facilitating the creation of applications that better meet user expectations. In conclusion, the requirement planning stage in RAD is pivotal, setting the stage for a user-centered and adaptable development process that is responsive to the dynamic nature of user needs.

Table 1. User Requirement for Database and Information System

Data Requirement	Goals/Purposes	Description
Local Attraction	Mapping Ecotourism Destination	This data is needed to map all destinations developed using the concept of ecotourism
	Identify status and local community participation	This data is needed to determine the status of ecotourism development as well as the form and level of participation of local communities

Data Requirement	Goals/Purposes	Description
Local Transportation	Identify the attraction of the destination	This data is needed to show the uniqueness of each destination developed using the concept of ecotourism
	Mapping the Local Transportation Station	This data is needed to map all sea and land transportation modes as accessibility to support local tourism
	Identify the type and capacity of the transportation	This data is needed to identify the type and capacity of transportation according to the number of tourists
	Price and PIC	This data is needed to identify transportation rental prices and the person in charge who can be contacted.
Local Accommodation	Mapping the Local Accomodation	This data is needed to map all homestay accommodation services to support local tourism
	Identify the type and capacity of the accomodation	This data is needed to identify the type and capacity of accommodation according to the number of tourists who will stay
	Price and PIC	This data is needed to identify the rental price of accommodation services and the person in charge who can be contacted.

Table 1 shows the requirement planning as the first step of system design. Information on local attractions, transportation, and accommodation is instrumental in streamlining the infrastructure development while considering tourism activities. The main focus lies in the thorough documentation and analysis of local attractions, which aids in identifying areas of interest for visitors and informs strategic development initiatives. Supportively, details on local transportation infrastructure contribute to the efficient movement of tourists within and around the destination, facilitating accessibility. Simultaneously, information regarding local accommodation options ensures the availability of suitable lodgings for tourists. Integrating these aspects into infrastructure planning is paramount for fostering sustainable tourism development. In conclusion, a comprehensive understanding of local attractions, transportation, and accommodation is indispensable for effective infrastructure control, aligning development initiatives with the region's demands and dynamics of tourism.

2.1.2 User Design Phase

The user design phase in the Rapid Application Development (RAD) method, utilizing Oracle APEX, is a critical stage where the identified user requirements are transformed into a tangible application prototype. The primary objective is to create a user interface that aligns seamlessly with the expectations and preferences of end-users. Supportively, Oracle APEX offers a robust platform for rapid prototyping, enabling developers to design and refine the user interface iteratively in collaboration with users. Incorporating Oracle APEX in the user design phase expedites the development process and ensures a more user-centric application, fostering a sense of ownership and satisfaction among end-users. In conclusion, the user design phase with Oracle APEX is pivotal in translating user requirements into a tangible and user-friendly application, contributing to the overall success of the RAD methodology.

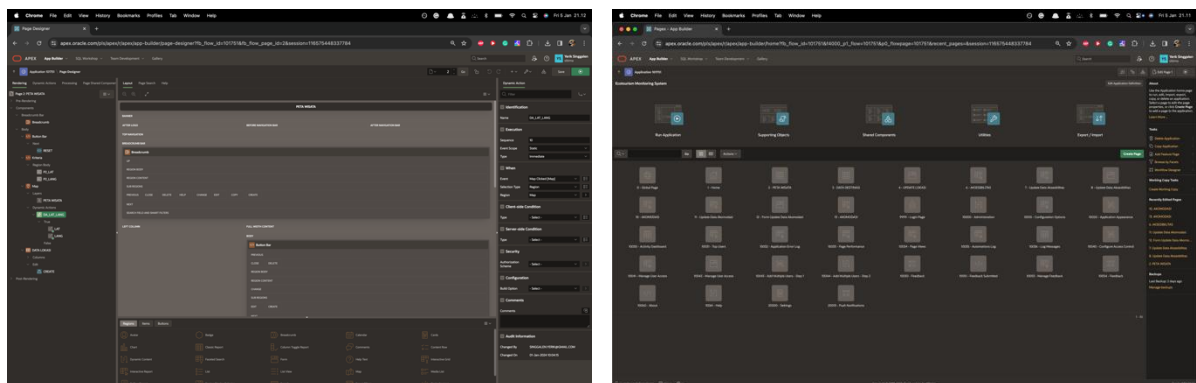


Figure 2. The Prototype Design using Oracle Apex

Figure 2 shows the prototype design using Oracle Apex. The interface is divided into three sections, each dedicated to information on attraction locations, transportation options, and accommodations. The primary focus is structuring the user interface to allow for straightforward navigation and focused access to essential information related to tourist destinations. This tripartite division ensures that users can efficiently explore details about

attractions, transportation facilities, and available accommodations without unnecessary complexity. This segmented design enhances user experience by simplifying the information retrieval process and caters to the specific needs of users seeking information on diverse aspects of their travel plans. In conclusion, dividing the interface into location-specific sections is a strategic design choice that optimizes user interaction and accessibility, contributing to a more user-friendly and effective system.

The advantage of using Oracle APEX lies in its capability to integrate user interfaces with a flexible database seamlessly. In the primary statement, attention is directed toward the critical strength of Oracle APEX, emphasizing its ability to harmonize user interfaces with diverse and adaptable databases. Supporting this, Oracle APEX offers a high degree of flexibility in data management and integration, enabling developers to connect user interfaces with various data sources effortlessly. This flexibility in integration provides a significant advantage in crafting responsive and efficient applications. In conclusion, this advantage reinforces Oracle APEX's position as a robust development platform, adept at meeting the intricacies of user interface integration with databases in application development environments.

2.1.3 Construction Phase

Each function and feature is tailored to align with the use case diagram during construction. The main emphasis is on translating conceptual use case scenarios into concrete functionalities within the system. Supporting this, the construction phase involves the detailed implementation of the identified use cases, ensuring that the developed functions accurately reflect the envisioned interactions and operations outlined in the use case diagram. This alignment is crucial for maintaining consistency between the intended system behavior and the actual implemented features, thereby enhancing the reliability and effectiveness of the final product. In conclusion, the meticulous adaptation of functions to the use case diagram in the construction phase ensures a faithful realization of the envisioned system, contributing to the overall success of the development process, as shown in the figure below.

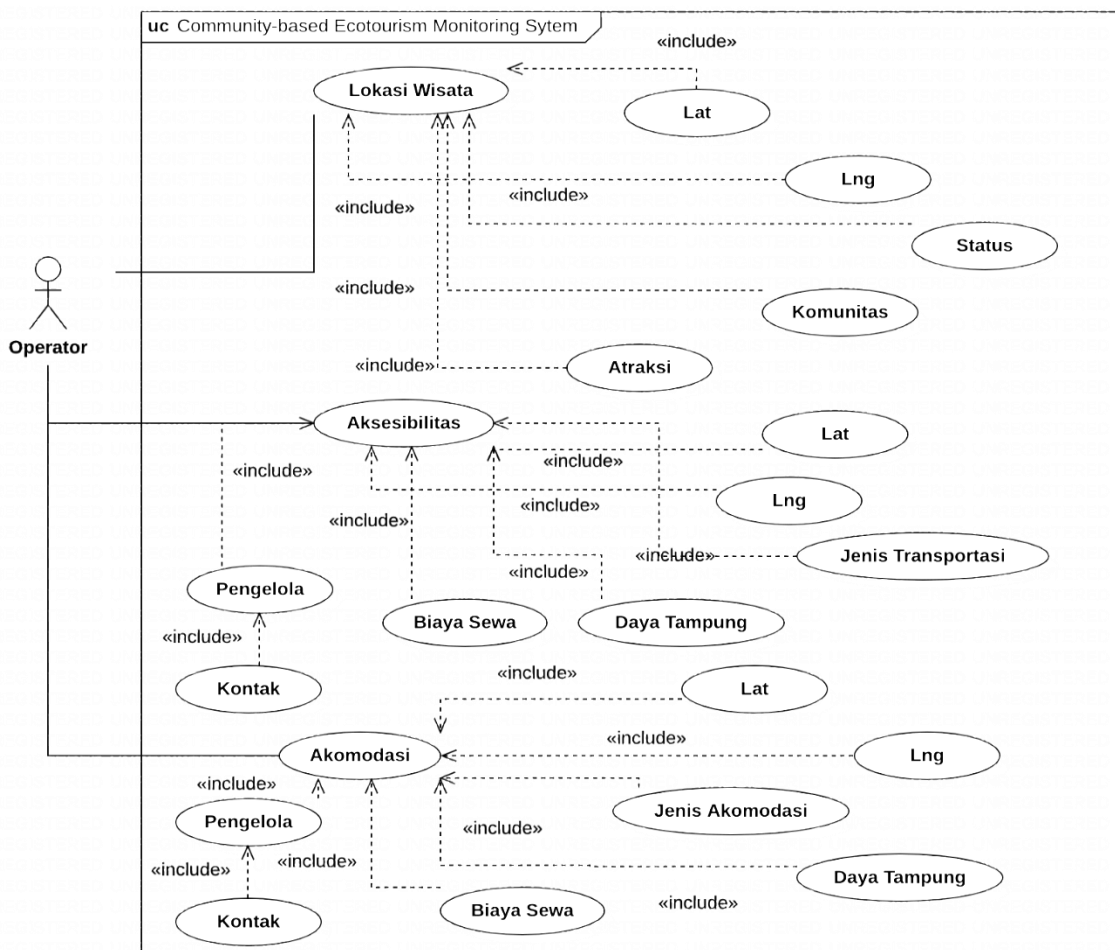


Figure 3. Use Case of Community-based Ecotourism Monitoring System

Figure 3 shows the use case of the community-based ecotourism monitoring system focusing on attraction, accessibility, and accommodation. The use case in system design underscores that every information about attractions, transportation, and accommodation needs to be visualized in map form with coordinate points, facilitating user comprehension. The primary assertion is rooted in the understanding that a visual representation, through the use of maps and coordinates, enhances the accessibility and interpretability of the information. This

approach supports users in quickly grasping the spatial relationships and distribution of critical elements within the system, such as tourist attractions, transportation routes, and lodging facilities. Integrating a map-based visualization feature enhances the user experience and provides a more intuitive and comprehensive understanding of the spatial aspects crucial for effective decision-making. In conclusion, incorporating visualized data through maps and coordinates is a valuable design choice for optimizing user interaction and comprehension within the system.

2.14 Cutover Phase

In the cutover phase, all features and functions of the application become operational without any hindrance. The primary focus is ensuring a seamless transition from the development to the live production environment, allowing end-users to utilize the application's capabilities fully. Supportively, the cutover phase involves thorough testing and validation to identify and address any potential issues that may impede the smooth operation of the application. Successfully deploying all features during this phase is pivotal for ensuring user satisfaction and system reliability. In conclusion, the cutover phase signifies the culmination of the development process, where the application is made fully accessible to operators, marking a significant milestone in the project's lifecycle.

Henceforth, the Rapid Application Development (RAD) method can be employed to design a community-based ecotourism monitoring database and information system in North Halmahera Regency. The primary assertion rests on RAD's adaptability and iterative nature, allowing for swift prototyping and continuous user involvement, aligning seamlessly with the dynamic and evolving requirements inherent in community-based ecotourism initiatives. Supportively, the method's emphasis on quick iterations and collaborative development ensures that the system is tailored to the specific needs and preferences of the local community. In this context, RAD expedites the development process and enhances the system's responsiveness to community-based ecotourism's unique challenges and opportunities. In conclusion, applying RAD is a judicious approach to crafting a bespoke and effective database and information system to monitor community-based ecotourism in North Halmahera Regency.

3. RESULT AND DISCUSSION

3.1 Current Tourism System in North Halmahera Regency

Community-based tourism in North Halmahera Regency constitutes a multifaceted approach to sustainable tourism that centers on the active involvement of local communities in the management and development of tourism activities. The primary objective is to empower and benefit the community economically, socially, and culturally while promoting responsible tourism practices [25]. This model involves collaboration between residents, governmental bodies, and private enterprises to leverage the region's unique cultural and natural assets [26]. Supportively, community engagement and participation are emphasized, ensuring that the benefits of tourism are equitably distributed among the local population [27]. Implementing community-based tourism in North Halmahera Regency fosters a sense of ownership and pride within the community and enhances the sustainability of tourism initiatives [28]. In conclusion, this approach is promising for promoting holistic and responsible tourism development in North Halmahera Regency.



Figure 4. Tagalaya Island and Ketinting as Local Transportation

Figure 4 shows that the North Halmahera Regency boasts diverse tourism potentials, including stunning underwater landscapes, pristine white-sand beaches, and expansive mangrove ecosystems. The primary allure lies in the rich biodiversity of the underwater realms, offering captivating views for snorkeling and diving enthusiasts. The region's white-sand beaches also provide idyllic settings for leisure and relaxation. At the same time, the extensive mangrove areas contribute to the ecological balance and serve as valuable habitats for various species. The multifaceted tourism offerings in North Halmahera Regency are compelling for nature enthusiasts and those seeking serene coastal experiences. In conclusion, the region's diverse natural attractions position it as a promising

destination for ecotourism and leisure, underscoring the potential for sustainable tourism development in North Halmahera Regency.

The government of North Halmahera Regency has endeavored to develop a unified data and mapping system, including visualizing tourist locations. However, the existing data within this system falls short of being fully utilizable for comprehensive analysis and decision-making processes. The primary limitation is that the criteria embedded in the database are predominantly comprised of general data, lacking specificity. While the system may provide a foundational overview of tourist locations, the absence of detailed and specific information hampers its effectiveness in facilitating nuanced analyses and informed decision-making. Enhancing the database by incorporating more detailed and specific criteria related to tourism elements would significantly improve its utility in guiding strategic initiatives for tourism development in North Halmahera Regency. In conclusion, there is a crucial need to refine the existing data infrastructure to ensure that it aligns with the specific requirements of tourism analysis and decision-making processes.

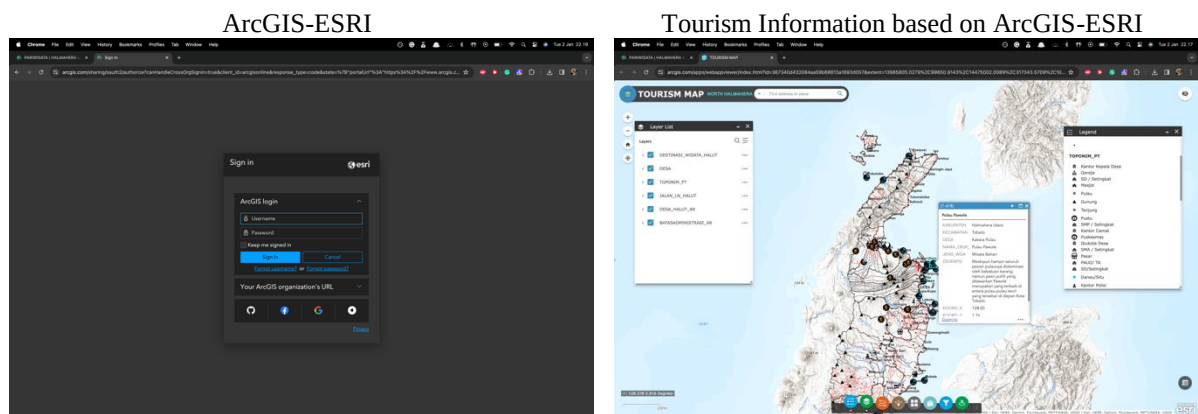


Figure 5. ArcGis-ESRI Website Halmahera Utara Satu Data Satu Peta

Figure 5 shows the initial system developed by the local government to share the location of the destination in North Halmahera Regency. However, tourism information that is readily accessible to the public through more familiar applications such as Google Maps diminishes the necessity for individuals to access government-designed applications. The primary advantage lies in the widespread use and user-friendly interface of platforms like Google Maps, offering convenience and ease of access to a broad user base. Supportively, these widely adopted applications provide comprehensive and user-generated content, including reviews and ratings, enhancing the overall tourism experience. The decentralization of tourism information to popular and user-friendly platforms reflects a responsive approach that aligns with contemporary user preferences. In conclusion, leveraging widely used applications for disseminating tourism information ensures broader public engagement and facilitates more seamless and user-centric access to relevant details.

The developed tourism information system should ideally serve as an exclusive tool for local governments as a foundation for decision-making. This includes identifying and analyzing community participation levels around tourist destinations, such as the forms of engagement as entrepreneurs or providers of accommodation and transportation services. The system's primary function is to provide localized and specific data essential for informed decision-making by local authorities. Supportively, this exclusivity ensures that the gathered information is tailored to the nuanced needs of the community and aids in devising targeted strategies for sustainable tourism development. Restricting the use of the tourism information system to local governments enhances its effectiveness in guiding policies and initiatives that align with the region's unique socio-economic and cultural landscape. In conclusion, an exclusive focus on government use ensures the strategic utilization of the system to foster sustainable tourism practices and community development.

The government-designed tourism website based on ArcGIS presents three primary challenges: the absence of information concerning local community dynamics, local transportation options, and local accommodation facilities, which are pivotal components in the tourism landscape. The main issue resides in the incomplete portrayal of essential elements contributing significantly to the overall tourist experience. The lack of information regarding the local community diminishes the website's ability to showcase the cultural richness and community engagement integral to sustainable tourism. Additionally, omitting details on local transportation and accommodation impedes tourists' ability to plan and navigate their visits effectively. Addressing these gaps is paramount for enhancing the website's comprehensiveness and ensuring a holistic portrayal of the destination. In conclusion, augmenting the website with comprehensive information on local community, transportation, and accommodation is crucial for optimizing its utility as a robust and informative platform for prospective tourists.

Subsequently, tourism information systems cannot be generalized but must be thematically designed by the characteristics of the tourist destination and the local ecological, economic, and socio-cultural conditions. The primary assertion is grounded in the understanding that each destination possesses unique attributes that require a tailored approach to information management. A thematic design ensures that the system is finely tuned to the

specific needs, attributes, and challenges of the destination, optimizing its relevance and effectiveness. This thematic approach is crucial for accommodating various tourist destinations' diverse and nuanced nature, contributing to more accurate, targeted, and sustainable tourism development strategies. In conclusion, customizing tourism information systems based on thematic considerations is imperative for aligning them with the distinctive features of each destination and fostering sustainable tourism practices.

3.2 Implementation of Rapid Application Development: Community-based Ecotourism Monitoring System

In implementing Rapid Application Development (RAD), prototypes are designed to align with user requirements, specifically showcasing coordinates for the locations of attractions, transportation modes, and accommodations. The main emphasis lies in RAD's iterative and user-focused nature, which allows for the rapid creation of prototypes to gather user feedback and refine the system accordingly. Supportively, designing prototypes based on user needs ensures that the resulting application is functional and tailored to the target users' specific requirements. This approach significantly contributes to user satisfaction and the system's overall success, placing user preferences and functionality at the forefront of the development process. In conclusion, implementing RAD with a focus on user-specific prototypes is instrumental in creating a system that meets the precise needs of users and fosters a more user-friendly and efficient application, as shown in the figure below.

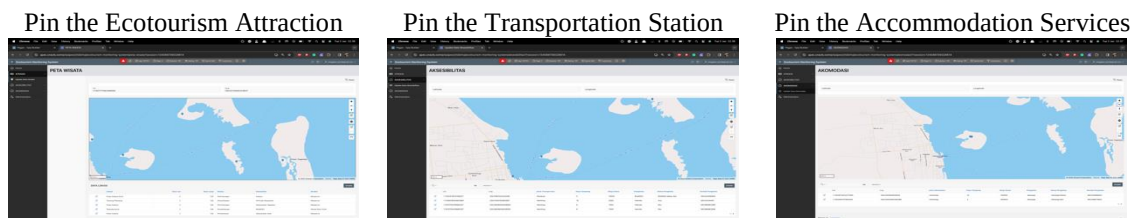


Figure 6. Geography Information System through Interactive Report Page

Figure 6 shows the integration of GIS through an interactive report page. This system displays locations on a map to facilitate a visual understanding for policymakers in analyzing the distribution of destinations developed through ecotourism approaches in North Halmahera. The primary focus is on utilizing visual representation as a tool for comprehending the spatial arrangement and relationships between various ecotourism sites. The visual display of locations on a map supports policymakers' ability to discern geographical patterns, assess the dispersion of ecotourism destinations, and make informed decisions about sustainable development. Incorporating a map-based visualization feature enriches the system's analytical capabilities, providing policymakers with a more intuitive and comprehensive understanding of the ecotourism landscape in North Halmahera. In conclusion, the integration of visual mapping is a valuable asset in aiding policymakers in effectively strategizing and managing ecotourism development in the region.

Integrating Geographic Information System (GIS) for decision-making represents a pivotal advancement in contemporary data analytics and strategic planning. The primary significance lies in GIS's ability to amalgamate spatial data, allowing decision-makers to visualize, analyze, and interpret information in a geospatial context [29]. Supportively, GIS facilitates a comprehensive understanding of the relationships between different geographical elements, enabling a more informed and nuanced decision-making [30]. Incorporating GIS into the decision-making process enhances the precision and effectiveness of strategic initiatives, particularly in sectors where spatial relationships and distributions play a critical role. In conclusion, integrating GIS is an invaluable tool for decision-makers, offering a spatially enriched perspective that contributes to more informed and contextually aware decision-making processes, as shown in the figure below.



Figure 7. Data Visualization based on Attraction, Accessibility, and Accommodation Page

Figure 7 shows the data visualization through a chart for the decision-making process. This system displays data related to coordinates and specific details regarding the community, local transportation providers, and accommodations. The primary emphasis is on presenting a comprehensive dataset that includes geographical coordinates and incorporates specific information crucial for understanding the socio-cultural and infrastructural aspects of the destination. Supportively, including data related to the community, local transportation, and accommodations enhances the richness of the information available to users, enabling a more holistic

understanding of the tourism ecosystem. This comprehensive approach ensures that users, whether policymakers or tourists, can access nuanced and relevant data for making informed decisions and planning sustainable tourism practices. In conclusion, integrating specific details within the system contributes to its functionality and utility, serving as a valuable resource for various stakeholders in the tourism domain.

Integrating accommodation and transportation databases with details on capacity, rental prices, and service types can significantly streamline the decision-making process for travelers, aiding them in selecting the optimal options. The primary emphasis lies in amalgamating comprehensive data sets, providing travelers with a holistic view of available accommodations and transportation services. This integration allows users to compare crucial factors such as capacity and pricing, facilitating an informed selection based on their preferences and budget constraints. The seamless integration of these databases enhances the user experience and contributes to more efficient and satisfactory decision-making for tourists. In conclusion, integrating accommodation and transportation databases is a valuable feature that empowers travelers with the information needed to make well-informed choices for a more enjoyable and tailored travel experience.

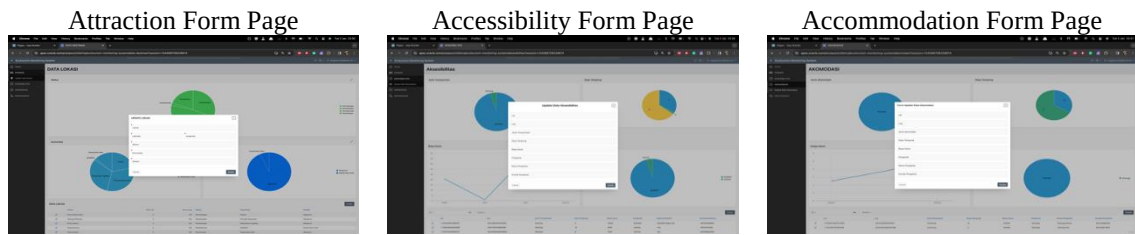


Figure 8. Form Page to Update the Data of Attraction, Accessibility, and Accommodation

Figure 8 shows the form page to update data. The form pages visualized within this system employ an interactive report modal dialog, presenting text fields in a pop-up format without requiring direct navigation to subsequent tabs. The primary innovation lies in utilizing modal dialogs, which enhance the user experience by displaying pertinent information within the existing interface. Supportively, this approach streamlines data entry and interaction, eliminating the need for users to navigate away from the current tab, thereby optimizing efficiency and reducing potential cognitive load. Integrating modal dialogs reflects a user-centric design strategy that prioritizes accessibility and convenience. In conclusion, this implementation enhances the system's functionality and user-friendliness by providing a seamless and interactive experience for users interacting with form pages.

The documentation of community participation in tourism development is imperative for informed policymaking to enhance the capacity of human resources supporting the tourism sector. Recording community engagement is a crucial metric to gauge the local populace's level of involvement and contribution to advancing the tourism industry [31]. This data may encompass participation levels in destination management, involvement in local tourism enterprises, and contributions to cultural and environmental preservation [32]. By understanding these participation levels, government bodies and stakeholders can formulate more effective policies to augment human resources' capacity to support the tourism sector. Involving the community in tourism decision-making is critical to sustainability and long-term success. In conclusion, the documentation of community participation serves as a pivotal foundation for crafting policies oriented toward empowerment and sustainable development in the context of tourism.

4. CONCLUSION

The findings of this research indicate that the Rapid Application Development (RAD) method is highly effective in designing an ecotourism information system and community database involved in destination development in North Halmahera Regency. The primary emphasis is on RAD's efficiency and adaptability in accommodating the dynamic needs of the ecotourism context. As revealed by the research, the method's iterative nature facilitates swift prototyping and continuous user involvement, ensuring that the system aligns with the community's specific requirements. However, the subsequent challenge lies in the operational aspect of the application, requiring support from human resources equipped with technology proficiency. Addressing this challenge demands a focus on developing the technological skills of human resources to ensure the seamless operation of the application. In conclusion, while RAD proves effective in the design phase, the ongoing success of the application necessitates investment in human resources with adept technology utilization skills.

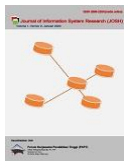
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