TEPIAN Vol. 5 No. 3 (September 2024) 66-75 p-ISSN 2721-5350 e-ISSN 2721-5369
https://doi.org/10.51967/tepian.v5i3.3104 © 2024 Tepian Politeknik Pertanian Negeri Samarinda

The Development of a Geographic Information System for Mapping Creative Economy Actors in Balikpapan Using the Prototype Method

Raihan Maheswara Rawanggalih
Software Engineering Technology, Polytechnic Agricultural of Samarinda, 75131, Indonesia
raihanmahes101@gmail.com

Asep Nurhuda*
Software Engineering Technology, Polytechnic Agricultural of Samarinda, 75131, Indonesia
acep.noor@gmail.com
**Corresponding author*

Bagus Satria
Software Engineering Technology, Polytechnic Agricultural of Samarinda, 75131, Indonesia
bagussatria@politanisamarinda.ac.id

Submitted: 2024-07-30; Accepted: 2024-09-20; Published: 2024-09-21

***Abstract*—** Geographic Information Systems (GIS) play a crucial role in collecting, managing, analyzing, and presenting geographically referenced data. This research focuses on the development of a GIS-based application designed to map and analyze the distribution of creative economy participants in Balikpapan. Using the System Development Life Cycle (SDLC) Prototype method, the study integrates spatial data with geographic analysis, utilizing technologies such as Node.js, Leaflet, Laravel, and QGIS in the development process. Data related to creative economy actors is gathered locally, while spatial data is sourced from the Ina Geoportal website. This web-based application provides comprehensive mapping capabilities, enabling users to identify strategic business locations, optimize business potential, and improve service accessibility. Additionally, the tool aims to offer insights for local government policymaking, contributing to regional economic growth and enhancing community welfare. The integration of GIS into the application also supports the preservation and promotion of regional cultural identity, offering valuable information for sustainable development. Ultimately, this research highlights the significant role of GIS in improving economic planning, fostering informed decision-making, and driving sustainable development in Balikpapan.

***Keywords*—** Geographic Information System, Creative Economy, Balikpapan, Prototype Method, Laravel, QGIS

I. INTRODUCTION

Geographic Information Systems (GIS) have evolved as a critical technology for collecting, storing, manipulating, analyzing, and presenting data related to the geographical location of a region. This technology plays an essential role in providing specific information regarding various geographical aspects such as topography, climate, vegetation, population density, infrastructure, and more. GIS's ability to integrate data from various sources and present it in the form of maps allows users to gain a comprehensive understanding of the conditions and characteristics of a particular area.

Kalimantan Timur, a province located in Indonesia, possesses unique geographical features that have been well-documented (Noor, 2020). Spanning an area of 16,732,065 hectares, it comprises a vast expanse of land and sea. The province consists of seven regencies and three cities, including Balikpapan, Bontang, and Samarinda. This region presents a complex geographical landscape that requires sophisticated tools like GIS for effective spatial analysis.

In the context of economic development, creative economy represents the fourth wave of economic development, succeeding the agricultural, industrial, and information economies (Wahyuni & Sakti, 2021). The creative economy is characterized by its reliance on creativity, which is a renewable resource, to generate added value. This economy leverages human creativity and knowledge, including cultural heritage and technology, to create economic opportunities.

The integration of GIS into the analysis of the creative economy offers a powerful platform for generating insights and deep understanding of the economic dynamics within Kalimantan Timur. This research focuses on leveraging spatial data and geographic analysis to map and analyze the distribution and characteristics of creative economy actors in the region. By utilizing spatial data, the study aims to identify potential locations for creative economy hubs, understand the geographical distribution patterns of various creative industries, and explore the relationship between geographical factors and the development of the creative economy in the area.

The potential contributions of this research are significant, as it seeks to optimize the creative economy's potential in Kalimantan Timur. The findings are expected to provide valuable insights into the distribution and characteristics of creative economy actors, which could guide the identification of strategic locations for businesses and support government initiatives in formulating policies and programs for creative economy development.

The goal of this study is to design a Geographic Information System (GIS) that serves as a map of creative economy actors, specifically within the context of the East Kalimantan Provincial Tourism Office. The system aims to provide a platform for optimizing the creative economy's potential, contributing to local economic growth, and offering a comprehensive

understanding of the distribution and characteristics of creative economy actors in the region.

This study is confined to the development of a web-based GIS application using the Laravel framework, focusing exclusively on the city of Balikpapan. The application will feature a map created using the Leaflet JavaScript API, presenting both spatial and attribute data on a website. The sample data will be limited to creative economy actors within Balikpapan, and the analysis will focus on mapping and analyzing their distribution and characteristics.

The expected outcomes of this study include a comprehensive map of creative economy actors in Balikpapan, providing users with easy access to information about local businesses and services. Additionally, the findings are anticipated to support government efforts in developing effective creative economy policies and programs, ultimately contributing to the region's economic growth and cultural identity.

II. Literature Review

A. Study of Literature

Some of the literature used as guides and references in this paper include:

1. Research conducted by Saefudin and Diah Islamiati from the Information Systems Study Program, Faculty of Information Technology, Universitas Serang Raya, titled "Sistem Informasi Geografis Pemetaan Daerah Pariwisata." This research produced a geographic information system that can provide information about tourist locations and determine the distance and travel time from the tourist's position to the desired tourist destination using Leaflet JS (Saefudin and Islamiati, 2023).
2. Research conducted by Arifin and Supriyatna from Management Informatics, Politeknik Negeri Lampung, titled "Sistem Informasi Geografis Untuk Pemetaan Lahan Kakao Menggunakan Leaflet JS Dan Geojson." This research resulted in a Geographic Information System (GIS) to help the community or relevant agencies know the distribution of cocoa plantations in Pesawaran Regency. The interactive map in the system was created using Leaflet JS and GeoJSON in a data format that can accommodate geographic elements on the website. The system tested using the black box method worked as expected, evidenced by 100% valid results (Arifin and Supriyatna, 2023).
3. Research conducted by Subandi Wahyudi from the Informatics Engineering Study Program, Faculty of Information Technology, Universitas Serang Raya, titled "Sistem Informasi Geografis Pemetaan Bencana Alam Di Kabupaten Pandeglang." This research produced a GIS application for natural disaster mapping in Pandeglang Regency, designed using UML tools. During the application development phase, Google Map API tools and PHP programming language with MySQL database were used. The GIS application was successfully created according to its purpose, which is to display spatial information about natural disasters in Pandeglang Regency in the form of a website. This information system can be utilized by both the residents of Pandeglang Regency and the Pandeglang Regency Government. With this application, the Pandeglang Regency Government can minimize casualties and material damage caused by natural disasters (Wahyudi et al., 2023).
4. Research conducted by Novriansyah et al., from Informatics Engineering, Faculty of Computer Engineering and Design, Universitas Nusa Putra, Indonesia, titled "Sistem Informasi Geografis Pemetaan Lokasi Tempat Pembuangan Sampah Legal di Sukabumi." The researchers concluded from the implementation and testing that all features on the website functioned well based on functional testing using the Black Box method. Additionally, responsiveness testing using LT Browser was conducted to evaluate the website's responsiveness on various devices, including desktops, smartphones, and tablets. The website successfully demonstrated good capabilities in adjusting its display and layout to different screen sizes and resolutions, meaning users can access and use the website optimally via desktops, smartphones, or tablets (Novriansyah et al., 2023).
5. Research conducted by Silvia from Information Systems, Institut Teknologi dan Bisnis Ahmad Dahlan Jakarta, titled "Sistem Informasi Geografis Pariwisata Kota Padang Dengan Menggunakan Google Map API." This research produced a GIS application for tourism in Padang City, useful for locating tourist attractions in Padang City and integrating them. The research aims for the GIS Tourism System in Padang City to provide information about tourist location maps and offer the shortest route and calculate the travel distance between location A and location B for tourists (Silvia Ningsih, 2023).

Geographic Information System Geographic Information System (GIS) technology is a computer system designed for collecting, examining, integrating, and analyzing information related to the earth's surface. Essentially, GIS combines three key elements: system, information, and geography (Anugraha et al, 2020).

According to Pak Dosen (Franz et al., 2023) the application of information technology is now widespread across various fields. In the field of mapping, technology plays a significant role in creating Geographic Information Systems (GIS). The development of information technology in GIS has begun to be implemented by many companies and government agencies. GIS is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographic data.

B. Creative Economy

According to Purnomo, the creative economy is a concept aimed at realizing sustainable economic development based on creativity. It involves utilizing resources that are not only renewable but also virtually unlimited, such as ideas, thoughts, talents, and creativity. In the creative era, the economic value of a

product or service is no longer determined by raw materials or production systems as it was during the industrial era but rather by the utilization of creativity and the creation of innovations through advancing technology. Industries can no longer compete in the global market by relying solely on the price or quality of their products; they must compete based on innovation, creativity, and imagination.

There are three key elements fundamental to the creative economy: creativity, innovation, and invention (Purnomo R.A., 2016).

1. Creativity can be described as the capacity or ability to generate or create something unique, fresh, and widely accepted. It involves producing new or practical ideas as solutions to problems or doing something different from what already exists (thinking out of the box). Someone who possesses creativity and can maximize this ability can create and produce something useful for themselves and others.
2. Innovation is the transformation of ideas or concepts based on creativity, utilizing existing inventions to produce better, value-added, and beneficial products or processes. For example, to see some innovations, look at several videos on youtube.com with the keyword "lifehack." These videos show how existing products are innovated to produce something with higher value and greater utility.
3. Invention this term emphasizes creating something that has never existed before and can be recognized as a work with a unique function or previously unknown feature. The development of Android and iOS-based applications is an example of technology and information-based inventions that greatly facilitate human activities in daily life.

C. Website

Website is a place on the internet that provides information in various data formats such as text, images, animations, sound, and even video. It can be accessed using various client applications, enabling more attractive and dynamic information presentation with organized management (Nurhuda and Amalia, 2018)

D. Data Flow Diagram (DFD)

Data Flow Diagram (DFD) is often used to describe an existing system or a new system to be developed in a logical manner, without considering the physical environment where the data flows or where the data will be stored (Dewi et al, 2020).

Data Flow Diagram (DFD) is a tool used to illustrate both manual and automated systems, or a combination of the two. It represents these systems as a network of interconnected components, following established rules. The primary benefit of DFDs is their ability to provide a comprehensive view of the system from a high level, which can then be broken down into more detailed levels. However, DFDs have some drawbacks, such as their inability to display processes related to calculations, decision-making, and iterative loops (Sumantri at al., 2022).

E. *Entity Relationship Diagram (ERD)*

The most used initial data modeling in databases is the Entity Relationship Diagram (ERD). ERD was developed based on set theory in mathematics. It is used for relational database modeling. Therefore, if the database storage uses Object-Oriented Database Management Systems (OODBMS), the database design does not necessarily need to use ERD. ERD has several notation streams such as Chen notation (developed by Peter Chen), Barker notation (developed by Richard Barker, Ian Palmer, Harry Ellis), Crow's Foot notation, and several other notations(Rossa and Shalahuddin, 2018).

F. *Leaflet JavaScript Library*

Leaflet operates efficiently across all mobile and desktop platforms, can be integrated with numerous plugins, has a beautiful design, is easy to use, simple, and has easily readable source code. Digital maps are displayed using the Leaflet JavaScript library, which supports GeoJSON files—a data format that can contain geographic elements.

Leaflet is highly supportive of mobile and desktop platforms, HTML5, and CSS3, as well as OpenLayer and the Google Maps API, which are popular JavaScript libraries for building map applications today. By leveraging Leaflet, developers without a GIS background can easily display web-based interactive maps on a server. Leaflet can display layers from GeoJSON files, apply styles, and create interactive layers such as markers that display pop-up information when clicked (Wardana and Jazman, 2017). The simple steps in building a basic web GIS using Leaflet are as follows:

1. Import the Leaflet library.
2. Display the map on a web page.
3. Display a GeoJSON file on the Leaflet map.

G. *Quantum GIS*

Quantum GIS (QGIS) is a Geographic Information System (GIS) software. QGIS is an open-source software used for geospatial data processing. It can run on Windows, Mac OSX, and Linux operating systems. QGIS serves as an alternative to other commercial GIS software such as ArcView, ArcGIS, or MapInfo Professional (Musniati, 2022).

Uses and Advantages of QGIS:

1. Uses of QGIS a) GIS data input
2. Geospatial data processing

Advantages of QGIS compared to other commercial GIS software:

1. Completely free
2. Open source, allowing for development and feature enhancements
3. Numerous plugins, extending the main functions of the software
4. Continually evolving application
5. Cross-platform (MacOS, Windows, and Linux)

Rawanggalih, R. M., Nurhuda, A., & Satria, B. (2024). The Development of a Geographic Information System for Mapping Creative Economy Actors in Balikpapan Using the Prototype Method. TEPIAN, 5(3), 66–75. https://doi.org/10.51967/tepian.v5i3.3104

H. *Prototype Model*

Prototype model is a software engineering approach that directly demonstrates how the software or its components will function in their environment before the actual construction phase begins. This model allows users to gain an initial understanding of the software being developed and to conduct early testing before the software is officially released (Shara *et al.*, 2022).

The following are the stages of software development using the prototype method:

1. Requirements Analysis
   At this stage, the developer identifies the software and all the system requirements to be developed.
2. Creating the Prototype
   A temporary design is created, focusing on the program flow for the user.
3. Prototype Evaluation
   The prototype is evaluated to determine if it meets the expected requirements.
4. System Coding
   If the prototype is approved, it is translated into the appropriate programming language.
5. System Testing
   Once the software is ready, it must undergo testing. This usually involves White Box Testing, Black Box Testing, and other methods.
6. System Evaluation
   Users evaluate whether the software meets their expectations. If it does, proceed to the next stage. If not, repeat the system coding and testing stages.
7. System Deployment
   The tested and approved software is ready for use. As a frequently used method, the prototype approach has its own advantages and disadvantages.

The prototyping system allows users to understand how the system operates effectively. In this research, the use of the prototyping method aims to provide the researcher with an overview of the application to be developed. This is achieved through the construction of a prototype application, which is evaluated by the user. The feedback from this evaluation will serve as a reference for creating the final application, which will be the final product and the output of this research (Pradipta et al., 2015).

III. RESEARCH METHODS

A. Research Procedures

This paper uses the SDLC (System Development Life Cycle) Prototype method in the system design to illustrate several stages in the development process. The complete research flow diagram can be seen in Figure 1.

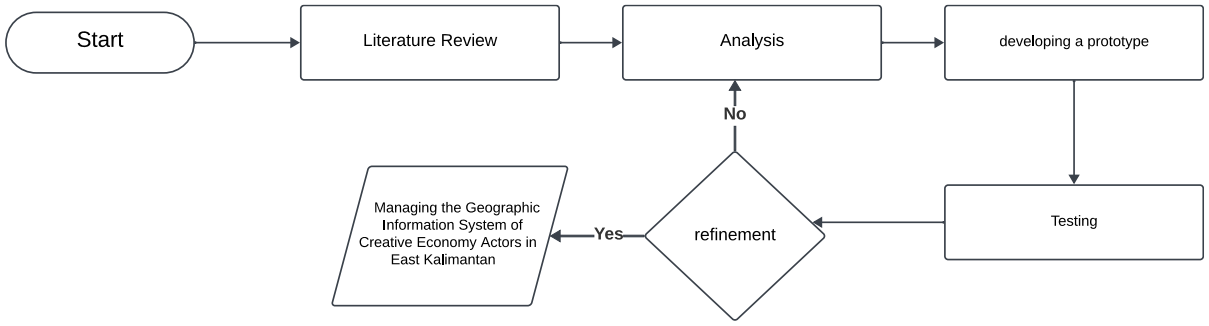

Figure 1. System Development Life Cycle Prototype Method

Here is an explanation of the research procedure stages:

1. Literature Study
   In this stage, a literature study on web-based Geographic Information System (GIS) development is conducted. Reference materials such as journals and several books related to the research are gathered.
2. Analysis
   In this stage, an analysis is conducted to identify the required features, such as mapping the locations of creative economy actors, types of creative industries, demographic data, etc. This helps the researchers determine the data or documents needed for the Geographic Information System to be developed.
3. Developing a Prototype
   a. Input Design
   The designed inputs are as follows:
   1) Data of Creative Economy Actors
   2) Business Profile of Creative Economy Actors and their owners
   3) Admin Data
   b. Output Design
   The system outputs are as follows:
   1) Spatial map display
   2) Non-spatial data display
   3) Data in the form of PopUps
4. Testing
   Testing involves observing the execution results through test data and examining the software functionality to see if the system works well. If there are issues with the system, a redesign is conducted to address the problems.

5. Geographic Information System
   At this stage, the thesis writing process is completed and published to present the research findings or studies that have been conducted.

B. System Design

In building this information system, the author designed the information system using Entity Relationship Diagram (ERD) and Data Flow Diagram (DFD)

1. Entity Relationship Diagram

The ERD shows the relationships between entities like Province, Regency, District, Category, User, and Admin. Provinces contain Regencies, which in turn contain Districts. Categories are associated with Users, who have attributes like gallery, password, name, and email. Admins are identified by id, name, and email. This diagram highlights the hierarchical and relational structure of these entities in the database. It can be seen in Figure 2.

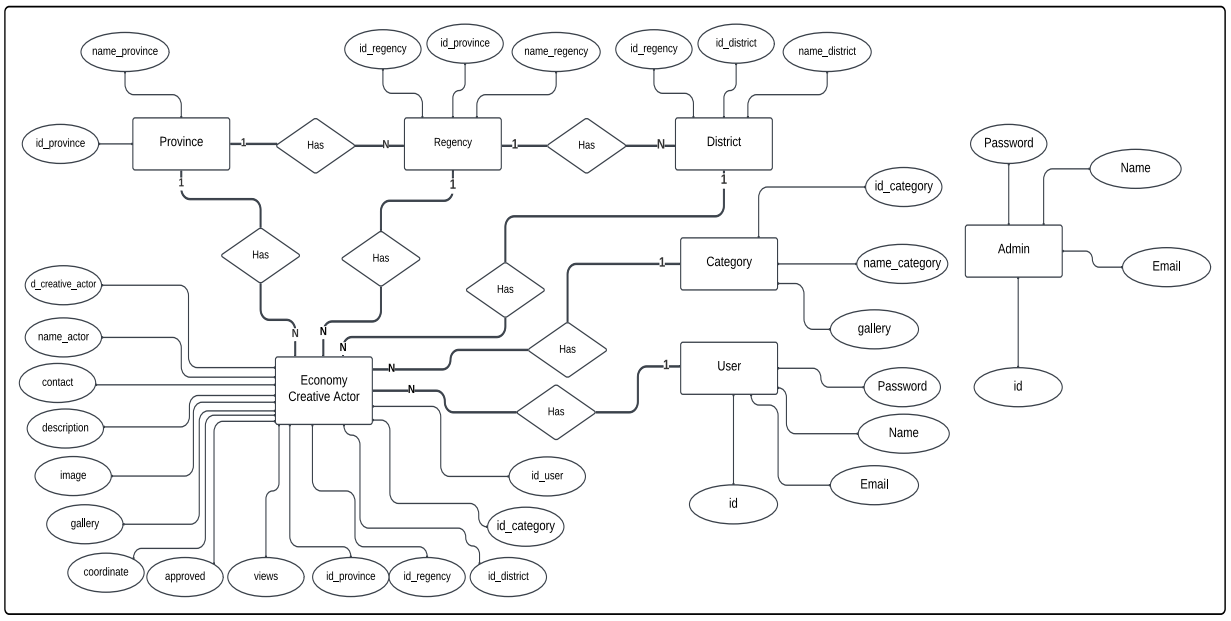

Figure 2. Entity Relationship Diagram

2. Data Flow Diagram Level 0

In this Level 0 DFD, there are three external entities: users as system members who can mark the map, visitors as system users, and administrators as system managers. For the user entity, there are several data flows such as creative economy actor data, registration data, and login data. For the administrator entity, there are also data flows such as login data, category data, regency/city data, and creative economy actor data. This can be seen in Figure 3.

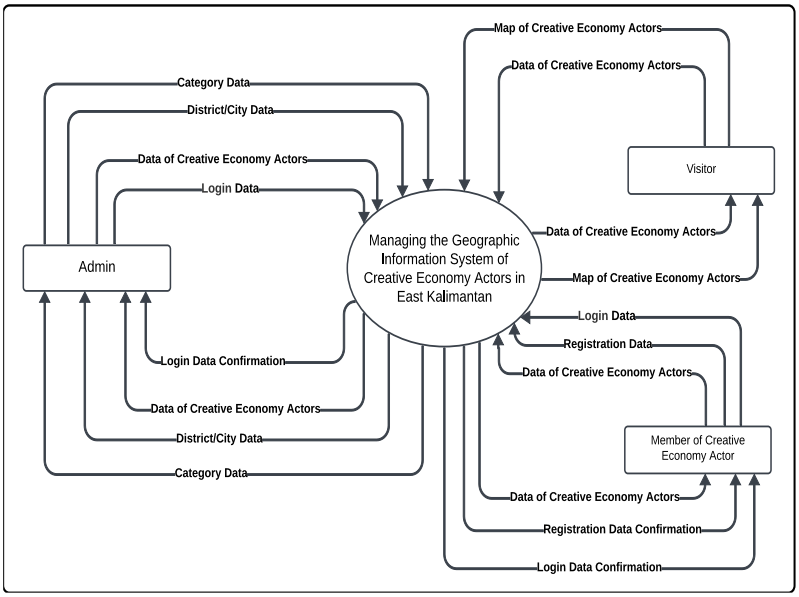

Figure 3. DFD Level 0

IV. Results and Discussion

The development of a web-based Geographic Information System (GIS) for mapping creative economy actors in Balikpapan was carried out using the Prototype method within the System Development Life Cycle (SDLC). This method includes iterative stages where user feedback is continually incorporated to refine the system. The stages of prototype development—such as literature study, analysis, prototype creation, testing, and final system deployment—are essential to understand the process behind the GIS system's development.

A. Application of the Prototype Development Stages

Each stage of the prototype method contributed significantly to the final system. Below is a detailed explanation of how these stages were applied and how the system evolved.

1. Literature Study

   During the literature study phase, research was conducted to gather references on web-based GIS systems. This included studying journal articles and books on GIS and the creative economy to define the system's objectives and design.

2. Analysis

   In the analysis phase, the required features were identified, such as mapping the locations of creative economy actors and displaying information on their types of creative industries and demographics. These requirements became the foundation for the system's data structure and functionality. This phase also allowed for identifying key datasets needed to develop the system, such as spatial data (location coordinates) and non-spatial data (actor profiles, industry types).

3. Developing a Prototype

   The prototype development phase involved creating an initial system model based on the identified requirements.

   a. Input Design

      The system accepts the following inputs:

      1) Creative economy actor data
      2) Business profiles of creative economy actors and their owners
      3) Admin data for system management

   b. Output Design

      The prototype outputs include:

      1) A spatial map displaying the locations of creative economy actors
      2) Non-spatial data in the form of actor profiles
      3) Pop-up information on the map when an actor's marker is clicked

   The initial prototype was evaluated by users to gather feedback, which informed further iterations.

4. Testing

   The system was tested using black-box testing to ensure its functionality matched user expectations. The test focused on ensuring the map displayed actor locations correctly, search functionalities worked as intended, and the system allowed admins to manage data efficiently. When issues arose, such as incorrect map layer display or incomplete data input forms, the system was redesigned to resolve these problems.

5. Final Geographic Information System

   After several iterations and improvements based on user feedback, the final GIS system was deployed. This phase marked the culmination of the research, and the system was documented in the thesis to present the findings and the development process. The final system offers a complete set of features, including a spatial map, actor profiles, and data management functionalities for admins.

B. Detailed Feature Descriptions

1. Creative Economy Map Page

   The Creative Economy Map page is the primary output of the GIS system. It displays the distribution of creative economy actors in the city of Balikpapan, with functionalities such as zooming in/out, managing layers, and search capabilities. This map is a direct result of the analysis and prototype development stages, where the spatial display of actor data was identified as a critical need.. This can be seen in Figure 5.

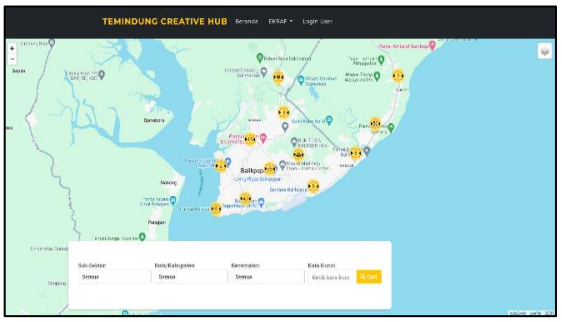

Figure 4. Creative Economy Map Page

2. *Creative Economy List Page*

   This page allows users to search for creative economy actors using filters such as subsector, regency/city, and actor name. Below the search fields, the total number of actors is displayed, along with cards containing brief actor information and a link to more detailed information. This feature was developed iteratively through user feedback and testing during the prototype phase. This can be seen in Figure 6.

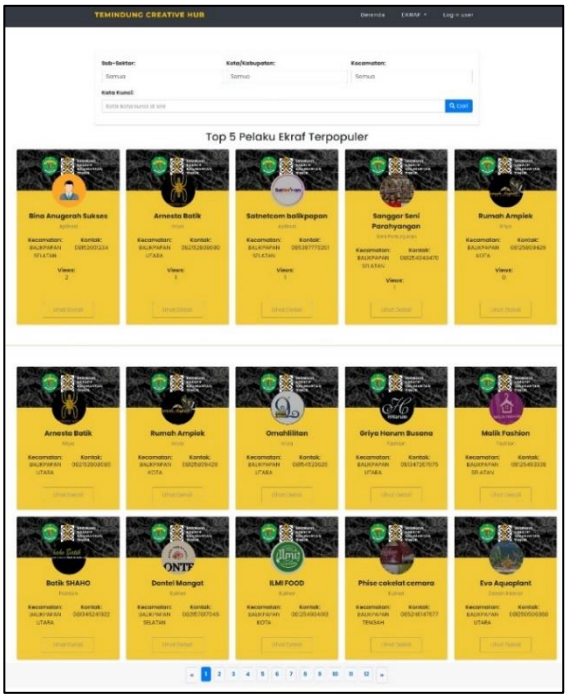

Figure 5. Creative Economy List Page

3. *Creative Economy Actor Detail Page*

This page provides detailed information about each creative economy actor, including their business profile and products. A Google Maps link is available to help users navigate to the actor's location. This functionality was refined during the testing phase to ensure it met user needs. This can be seen in Figure 6.

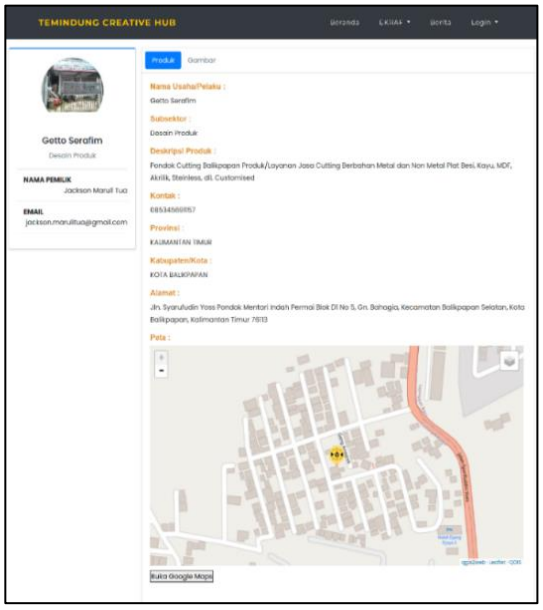

Figure 6. Creative Economy Actor Detail Page

4. *Gallery Page*

The gallery showcases products from creative economy actors. When a visitor clicks on an image, it will be enlarged. This can be seen in Figure 7.

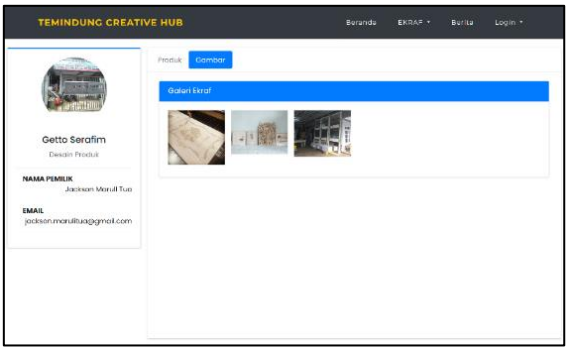

Figure 7. Gallery Page

5. *Login Page for Users and Admins*

On the login page for users and admins to access the system, they enter their email and password. If successful, users and admins will be redirected to the dashboard. At the top, there is a creative economy logo. This can be seen in Figure 8.

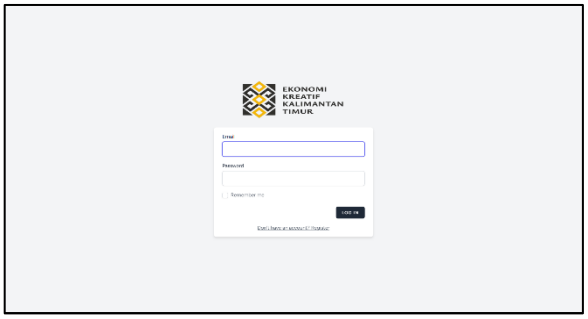

Figure 8. Login Page for Users and Admins

6. *Registration Page*

The registration page allows creative economy actors to create an account by filling in their username, email, password, and confirm password. Once completed, the user will be redirected to the user dashboard. This can be seen in Figure 9.

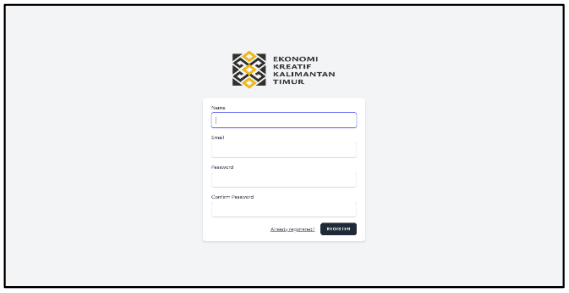

Figure 9. Registration Page

7. *User Dashboard Page*

The user dashboard page is displayed after a successful registration. On the left side, there is the name and a button to manage the profile. On the right side, there is a product page and an empty image placeholder. There are also buttons for a data input tutorial and adding creative economy data. This can be seen in Figure 10.

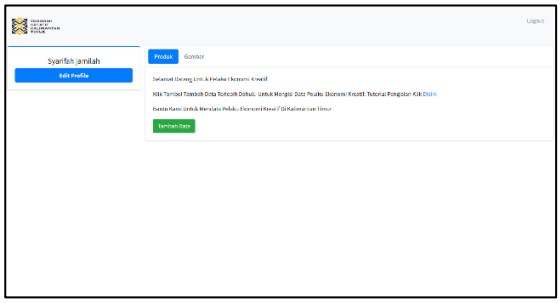

Figure 10. User Dashboard Page

8. *Product Addition Page*

This page appears when a creative economy actor has added a product. There is an edit button for modifying data. When data is first input, the status is set to pending admin approval. If the admin does not approve, the data will be automatically deleted. This can be seen in Figure 11.

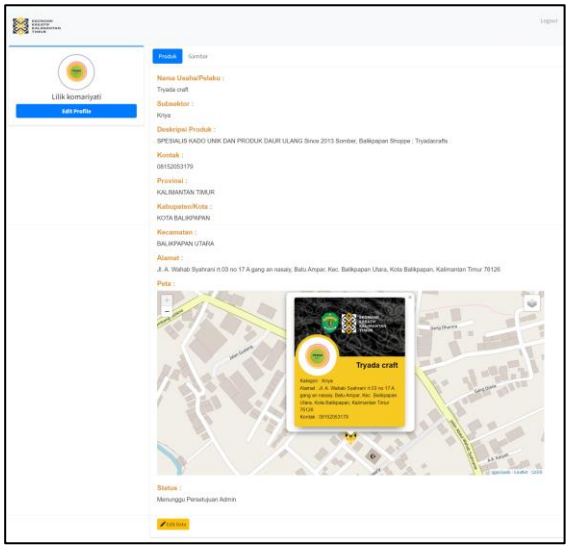

Figure 11. Product Addition Page

9. *Gallery Data Page*

On the gallery data page for creative economy actors, products are showcased so visitors can learn about their offerings. This can be seen in Figure 12.

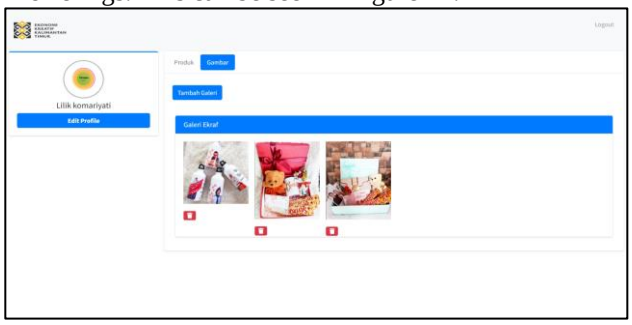

Figure 12. Gallery Data Page

10. *Admin Dashboard Page*

The admin dashboard page is displayed after the admin logs in. It shows the total data on the creative economy. On the right side, there is a menu to manage creative economy data and article data. This can be seen in Figure 13.

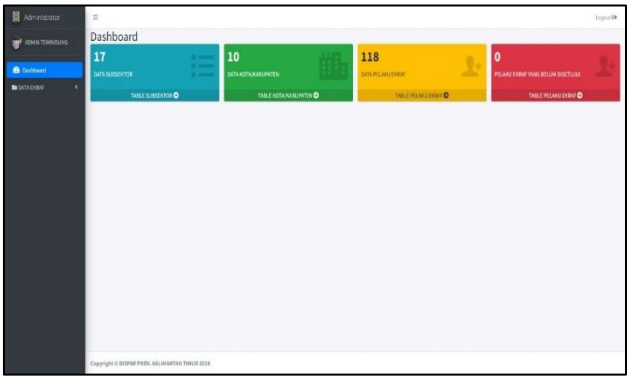

Figure 13. Admin Dashboard Page

11. *Subsectors Data Page*

The subsectors data page contains a table of creative economy subsectors. The admin can add, edit, delete, and search subsector data. The table includes columns for number, subsector name, and marker image. This can be seen in Figure 14.

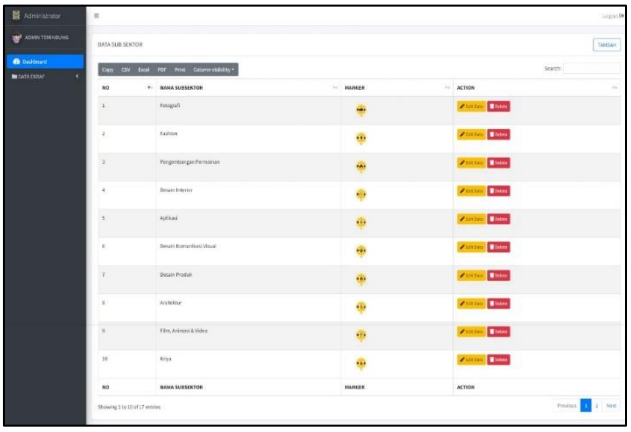

Figure 14. Subsectors Data Page

12. *Regency/City Data Page*

The regency/city data page contains a table with data on provinces, regencies/cities, and districts. The admin can only view and search the data. This can be seen in Figure 15.

Figure 15. Regency/City Data Page

Rawanggalih, R. M., Nurhuda, A., & Satria, B. (2024). The Development of a Geographic Information System for Mapping Creative Economy Actors in Balikpapan Using the Prototype Method. TEPIAN, 5(3), 66–75. https://doi.org/10.51967/tepian.v5i3.3104

13. *Creative Economy Actors Page*

The creative economy actors page contains a table of creative economy actors. The admin can add data, and the edit button allows the admin to change the status of data that actors have added for public display. The delete button is used to remove product data input by users without deleting the actors' accounts. This can be seen in Figure 16.

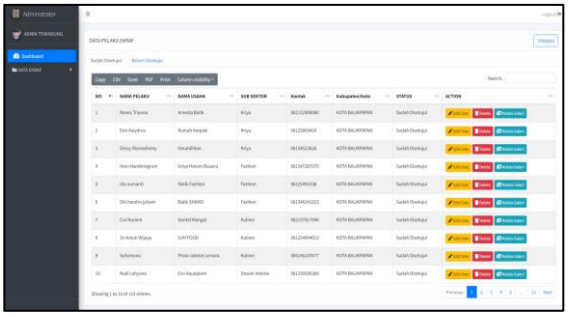

Figure 16. Creative Economy Actors Page

14. *Map Page for Admin*

On the creative economy actor's data menu page, the admin can view visualizations of creative economy data, including a map of creative economy actors, a donut chart, and a stacked bar chart. This data helps the leadership of the Balikpapan Tourism Office make decisions to enhance the creative economy in Balikpapan. This can be seen in Figure 17.

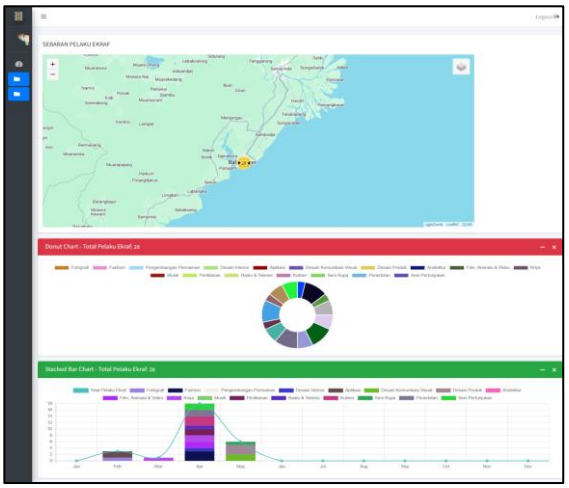

Figure 17. Map Page for Admin

Testing was conducted using the black box testing methodology. This approach focuses on evaluating the system's functionality from an end-user perspective, without delving into the internal code structure. Each test is detailed with key aspects such as test number, the page being tested, user actions, expected system responses, and the actual test results. This methodology ensures that the application operates correctly and meets user needs and expectations. This can be seen in Table 1.

Table 1 Black Box Testing

Input	Output	Test results
Creative Economy Actors Map Page	Displaying data on creative economy actors as desired, changing layers on the map as desired, showing details of creative economy actors.	Succeed
Creative Economy Actors List Page	Displaying data on creative economy actors as desired, showing details of creative economy actors.	Succeed
Creative Economy Actor Detail Page	Navigate to the Google Maps website and show directions to the actor's address from our location.	Succeed
Login Page	Username and Password	Succeed
Creative Economy Actors Registration	Fill in the data completely	Succeed
Creative Economy Actors Main Page	Add, edit, and delete creative economy actor data by entering all required information.	Succeed
Select the logout button.	Exit the Creative Economy Actors main page and enter the visitor dashboard page.	Succeed
Admin Main Page	Category Data Page, District/City Data Page, Creative Economy Actors Data Page, Creative Economy Map Page	Succeed
Category Data Page	Add, edit, and delete Category Data	Succeed
District/City Data Page	View district/city data	Succeed
Creative Economy Actors Data Page	Add, edit, and delete Creative Economy Actors Data	Succeed
Creative Economy Map Page	View Creative Economy Map	Succeed

V. CONCLUSION

The development of this web application has emphasized the need for a responsive, user-friendly

design with accurate and up-to-date geographic data. By selecting appropriate web technologies, such as web-based GIS frameworks and spatial databases, the system provides a robust platform for storing and accessing information about creative economy actors. Ensuring that interactive features facilitate easy data access, exploration, and visualization was also a key aspect of the development process.

The successfully designed web application aims to optimize the potential of the creative economy in Balikpapan. The system facilitates the identification and outreach of various creative economy actors, thereby enhancing collaboration and promotion opportunities. This increased visibility is expected to drive regional economic growth by boosting awareness and participation in the creative economy sector.

The prototype method used in the development of this application has proven to be highly effective in ensuring the application meets user needs. With continuous iterations and direct feedback from users during the development process, this method allowed for timely adjustments and improvements to the application's features. This contributed to the creation of a more user-centered application, enhancing the system's overall effectiveness.

Based on this study, it is recommended that the Balikpapan local government, particularly the Tourism Office, continue to develop and utilize GIS to support decision-making in creative economy development. Expanding the research area beyond Balikpapan City and providing ongoing training for creative economy actors and the broader community are essential to maximizing the benefits of this technology.

Future improvements should focus on integrating more advanced data analysis features, providing real-time trend and statistics displays, and ensuring mobile device support. Enhancing data security and privacy is crucial given the sensitivity of business information. Additionally, refining the user interface to be more intuitive and user-friendly, and adding options for user feedback and reporting will improve the system’s effectiveness and responsiveness to real-world needs.

REFERENCES

Anugraha N, Angriawan R, and Mashud (2020) ‘Sistem Informasi Geografis Layanan Publik Lingkup Kota Makassar Berbasis Web’, Journal Of Computer And Information Technology, 4(1), Pp. 35–40. Available At: Http://E-Journal.Unipma.Ac.Id/Index.Php/Doubleclicksisteminformasigeografislayanan….

Arifin O, and Supriyatna A.R. (2023) ‘Sistem Informasi Geografis Untuk Pemetaan Lahan Kakao Menggunakan Leaflet Js Dan Geojson’, 17, Pp. 1–8.

Dewi B.R., Rahajo S. And Adhitya E. (2020) Perancangan Sistem Informasi Puskesmas Berbasis Web.

Franz A, Salman and Satria B. (2023) ‘PELITA TEKNOLOGI Sistem Informasi Geografis Tanah Bersertifikat Pada Desa Kersik Kecamatan Marangkayu Kabupaten Kutai Kartanegara’, Jurnal Pelita Teknologi, 18(1), Pp. 10–14.

Noor I. (2020). *Laporan Kinerja Pemerintah Provinsi Kalimantan Timur Tahun 2020*. Pemerintah Provinsi Kalimantan Timur.

Novriansyah M.A., Simatupang D.S. And Sujjada A. (2023) ‘Sistem Informasi Geografis Pemetaan Lokasi Tempat Pembuangan Sampah Legal Di Sukabumi’, G-Tech: Jurnal Teknologi Terapan, 7(3), Pp. 1194–1206. Available At: Https://Doi.Org/10.33379/Gtech.V7i3.2869.

Nurhuda A. and Amalia R. (2018) Aplikasi Pemasaran Perumahan Pada Kantor Mahakam Grande Berbasis Web.

Pradipta A.A., Prasetyo Y.A., Ambarsari N. (2015) ‘Pengembangan Web E-Commerce Bojana Sari Menggunakan Metode Prototype’.

Purnomo R.A. (2016) ‘Ekonomi Kreatif : Pilar Pembangunan Indonesia’, Http://Jurnal.Unmuhjember.Ac.Id/Index.Php/PEKED/Article/View/1286 [Preprint].

Rossa A.S. and Shalahuddin M. (2018) ‘Rekayasa Perangkat Lunak (Tersetrukur dan Berorientasi Objek’.

Saefudin And Islamiati, D. (2023) ‘Sistem Informasi Geografis Pemetaan Daerah Pariwisata’, Jsii (Jurnal Sistem Informasi), 10(1), Pp. 98–102. Available At: Https://Doi.Org/10.30656/Jsii.V10i1.6247.

Shara H., Putri M.A., Kurniawan A., Prakoso B.Y., Budilaksono S., Kencana W.H., and Febriyanti. (2022) Jusikom : Jurnal Sistem Komputer Musirawas Smart Farming Teknologi Monitoring Produksi Dan Pemasaran Kebun Organik.

Silvia Ningsih (2023) ‘Sistem Informasi Geografis Pariwisata Kota Padang Dengan Menggunakan Google Map API’, Journal Of Computer Science And Technology (JOCSTEC), 1(2), Pp. 47–56. Available At: Https://Doi.Org/10.59435/Jocstec.V1i2.43.

Sumantri R.B.B., Setiawan R.A. And Sandi A, A.S. (2022) ‘Sistem Informasi Geografis Untuk Pemetaan Pariwisata Kabupaten Karanganyar Berbasis Web’, Methomika Jurnal Manajemen Informatika Dan Komputerisasi Akuntansi, 6(1), Pp. 1–9. Available At: Https://Doi.Org/10.46880/Jmika.Vol6No1.Pp1-9.

Wahyuni S. and Sakti G. (2021) *Peta Jalan Pengembangan Ekonomi Kreatif Daerah Provinsi Kalimantan Timur Periode 2021-2025 (Talanpekda Kaltim 2021-2025)*. Provinsi Kalimantan Timur.

Wahyudi, S., Kautsar, A. And Alfi, A. (2023) ‘Sistem Informasi Geografis Pemetaan Bencana Alam Di Kabupaten Pandeglang’, 10, Pp. 1–6.

Wardana M.I. And Jazman M. (2017) Rancang Bangun Sistem Informasi Geogafis Pemetaan Ruang Ujian Menggunakan Bootstrap Dan Leaflet.Js (Studi Kasus: Fakultas Sains Dan Teknologi UIN Suska Riau).

Rawanggalih, R. M., Nurhuda, A., & Satria, B. (2024). The Development of a Geographic Information System for Mapping Creative Economy Actors in Balikpapan Using the Prototype Method. TEPIAN, 5(3), 66–75. https://doi.org/10.51967/tepian.v5i3.3104