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Development of a Web-Based Youth Innovation Village System Using Laravel Framework

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Abstract

Youth play a crucial role in social development and serve as agents of change contributing to national progress. Karang Taruna, as a youth organization, has a strategic role in enhancing social welfare, including in Mekarjati Village. Since its establishment on November 10, 2013, Karang Taruna Mekarjati has grown with 13 subunits in each neighborhood unit (RW), serving a community of 11,881 people. However, the organization's business processes, such as member registration, social activity management, leadership training, and the formation and monitoring of MSMEs or startups, are still conducted manually. This results in operational inefficiencies and increases the risk of administrative errors. This study aims to design and develop a web-based system called "Youth Innovation Village" to support the digitalization of Karang Taruna Mekarjati's management. The system is built using the Laravel Framework, with process modeling based on Business Process Modeling Notation (BPMN), the PHP programming language, and the MySQL database. The software development approach used is Agile Scrum, allowing flexibility in adapting to the organization's needs throughout the system development life cycle. The results of this study indicate that the implementation of Youth Innovation Village significantly enhances the effectiveness and efficiency of Karang Taruna's management. The system accelerates membership administration, optimizes social activity coordination, and provides direct benefits to the organization's members in Mekarjati Village. Through this digitalization, Karang Taruna can become more adaptive to technological advancements and expand its social impact more effectively.

Keywords: *Youth Innovation Village, Laravel, BPMN, Agile Scrum, Digitalization, Operational Efficiency*

I. Introduction

Youth represent the power and strength of a nation, signifying that the younger generation plays a crucial role in national development. As social revolutionaries, youth are considered strategic agents of change due to their strong mentality, high potential, strong competitiveness, and quick-thinking ability [1] . Given this vital role, Karang Taruna was established as a social organization to raise awareness and responsibility, particularly among young people, from the regional to the urban level. The primary focus of this organization is on social welfare rather than profit-making [5]. The Mekarjati Village Government, located in West Karawang District, Karawang Regency, has established Karang Taruna Mekarjati, which has a significant role in fostering youth empowerment and community development. Since its founding on November 10, 2013, Karang Taruna Mekarjati has grown into a structured organization consisting of 13 subunits in each RW (Rukun Warga), serving a total population of 11,881 people.

The organization carries out several key business processes, including member registration, social activity implementation, leadership training programs, and the formation and monitoring of MSMEs (Micro, Small, and Medium Enterprises) and startups [3]. Despite its significant contributions, Karang

Taruna Mekarjati faces challenges in managing its operations due to the absence of an integrated digital system. Most of its administrative processes, such as membership registration, proposal and execution of social activities, leadership training records, and business development monitoring, are still conducted manually. This manual approach results in inefficiencies, increased risk of errors, and difficulties in tracking the progress of various initiatives [2]. Digital transformation in non-profit youth organizations has been recognized as a key enabler for improving operational effectiveness, transparency, and community engagement (*Digital Transformation*, n.d.). Therefore, the need for a digital information system that can streamline and optimize Karang Taruna's business processes has become increasingly urgent. To address this issue, this study aims to design and develop a web-based system called "Youth Innovation Village" to be implemented in Karang Taruna Mekarjati. The system will support the organization's business processes, ensuring improved efficiency and effectiveness in its operations. The development of this system adopts the UML (Unified Modeling Language) modeling approach, BPMN (Business Process Modeling and Notation), PHP (Hypertext Preprocessor) as the programming language, MySQL as the database management system, and the Laravel framework [6]. This research is expected to contribute significantly to Karang Taruna Mekarjati by enhancing the efficiency and effectiveness of its business processes.

Additionally, it will provide direct benefits to Karang Taruna members by enabling better management of activities, improving data accuracy, and facilitating easier access to organizational resources. With the implementation of the Youth Innovation Village system, Karang Taruna Mekarjati can leverage digital technology to maximize its impact on the local community, ensuring sustainable youth development and improved organizational governance.

Youth play a strategic role in social development as agents of change who drive innovation and societal transformation. According to Chigunta (2002), young people have great potential in shaping innovation ecosystems through various community-based initiatives [1]. Furthermore, the United Nations Development Programme (2020) report emphasizes that youth participation in social activities can improve community well-being and build their leadership capacities for the future [11]. In Indonesia, the Karang Taruna organization plays an essential role in increasing youth participation in social development. As a social youth organization, Karang Taruna focuses on social welfare development and youth empowerment at the village and sub-district levels [4] .

Digital transformation has become a key factor in enhancing the effectiveness of social organizations. Drucker (2019) highlights that organizations that fail to adapt to technology tend to experience operational inefficiencies [2]. A study by Goyal and Sergi (2021) indicates that adopting digital technology in non-profit organizations can improve transparency, administrative efficiency, and member participation in organizational activities [8],[15]. However, many social organizations in Indonesia still struggle to implement an integrated information system, leading to manual business processes that hinder efficiency and accuracy.

Laravel is one of the most popular PHP frameworks used in web-based system development. Sommerville (2020) states that Laravel offers modern features such as Model-View-Controller (MVC) architecture, Object-Relational Mapping (ORM), and enhanced security, which facilitate developers in building robust and structured applications [9]. Fowler (2021) further explains that the use of Unified Modeling Language (UML) and Business Process Model and Notation (BPMN) in software development helps in understanding business processes and system requirements effectively [6], [13].

Agile Scrum is a widely adopted software development methodology that emphasizes flexibility and quick iterations to meet user needs. Schwaber & Sutherland (2020) state that this method is highly effective for developing systems that require continuous adaptation and real-time improvements[10], [14]. Several studies suggest that Agile Scrum enhances collaboration among development teams and ensures that the software produced aligns with organizational needs [3]. Therefore, this method is

chosen in this research to develop the Youth Innovation Village system to be more responsive to the needs of Karang Taruna Mekarjati.

Based on the literature review, it is evident that youth involvement in social development, challenges in digitization for social organizations, the use of Laravel as a software development framework, and the implementation of Agile Scrum as a development methodology form a strong foundation for the development of the Youth Innovation Village System. By referring to previous studies, this research is expected to contribute significantly to the digitalization of social organizations, particularly in the management of Karang Taruna Mekarjati [12].

II. Methods

This research employs a qualitative and quantitative approach to develop a web-based system, "Youth Innovation Village," for the Karang Taruna Mekarjati organization. The study follows the software development life cycle (SDLC) using the Agile Scrum methodology, incorporating system modeling with Unified Modeling Language (UML) and Business Process Model and Notation (BPMN) to ensure an efficient and adaptable system. This study is applied research aimed at developing a digital solution to optimize the business processes of Karang Taruna Mekarjati. The research stages consist of:

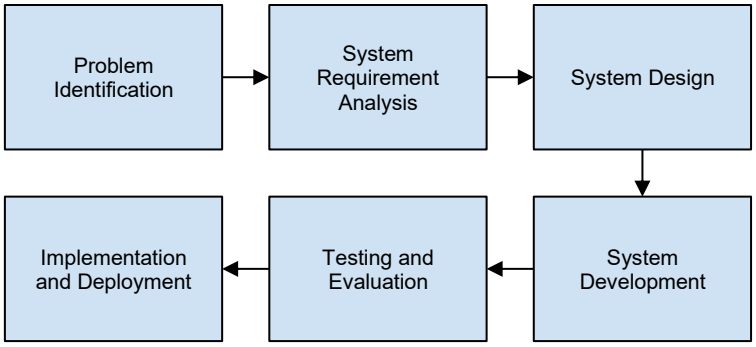

Figure 1. Research Stages

1. **Problem Identification:**
   a. Analysis of current business processes at Karang Taruna Mekarjati.
   b. Identification of inefficiencies in membership registration, event management, leadership training, and MSME/startup monitoring.

This is an example of a youth organization (Karang Taruna) existing business process using BPMN in Indonesian.

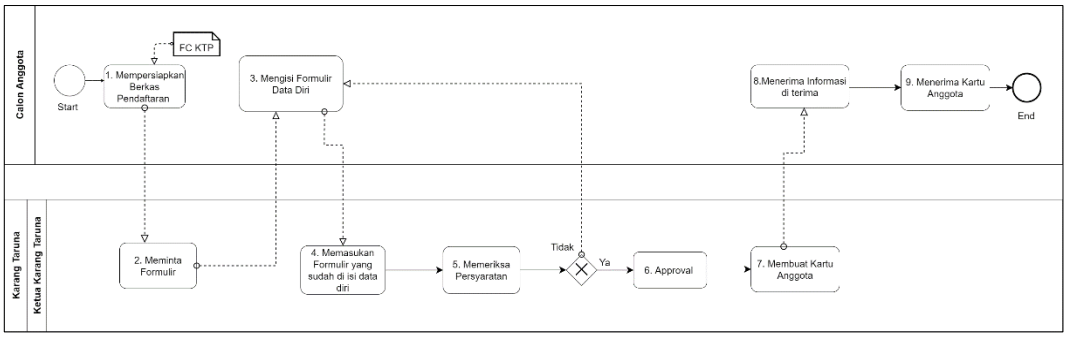

Figure 2. Existing Business Process for Karang Taruna Member Registration

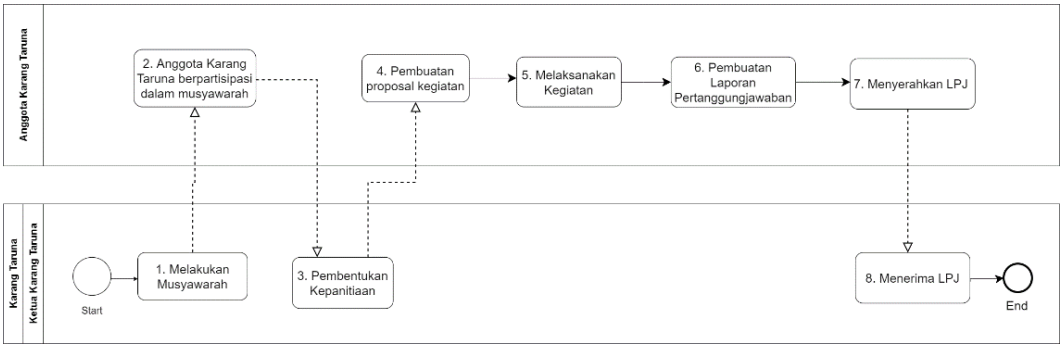

Figure 3. Existing Business Processes for Implementing Karang Taruna Activities

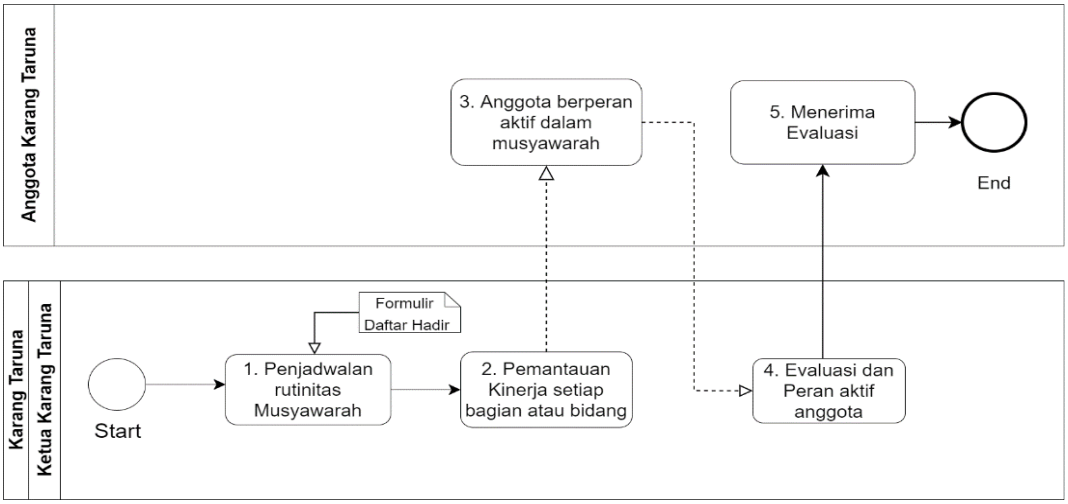

Figure 4. Existing business process of Cadre Development and Leadership Training

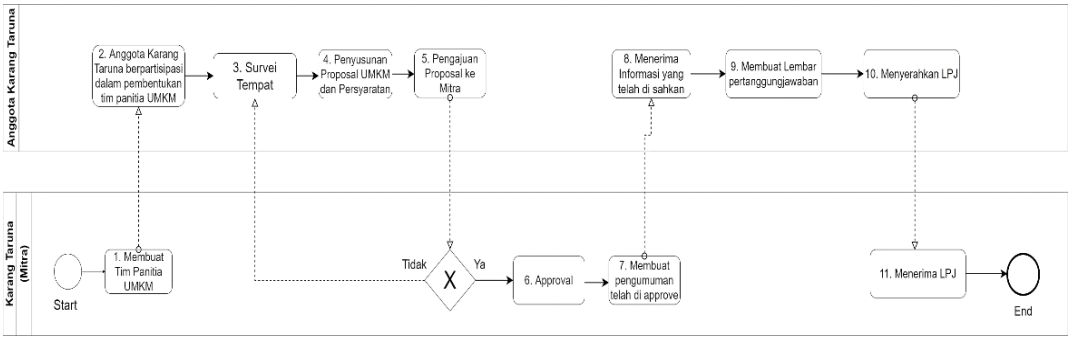

Figure 5. Existing business process of UMKM formation or Startup monitoring

2. System Requirement Analysis:

a. Requirement gathering through interviews and observation with Karang Taruna members and administrators.

b. Documentation of functional and non-functional requirements.

3. System Design:

a. System architecture design using Laravel framework.

b. Process modeling using BPMN for business workflow representation.

c. System structure modeling using UML diagrams (use case, activity, and class diagrams). This is an example of UML diagram in this application.

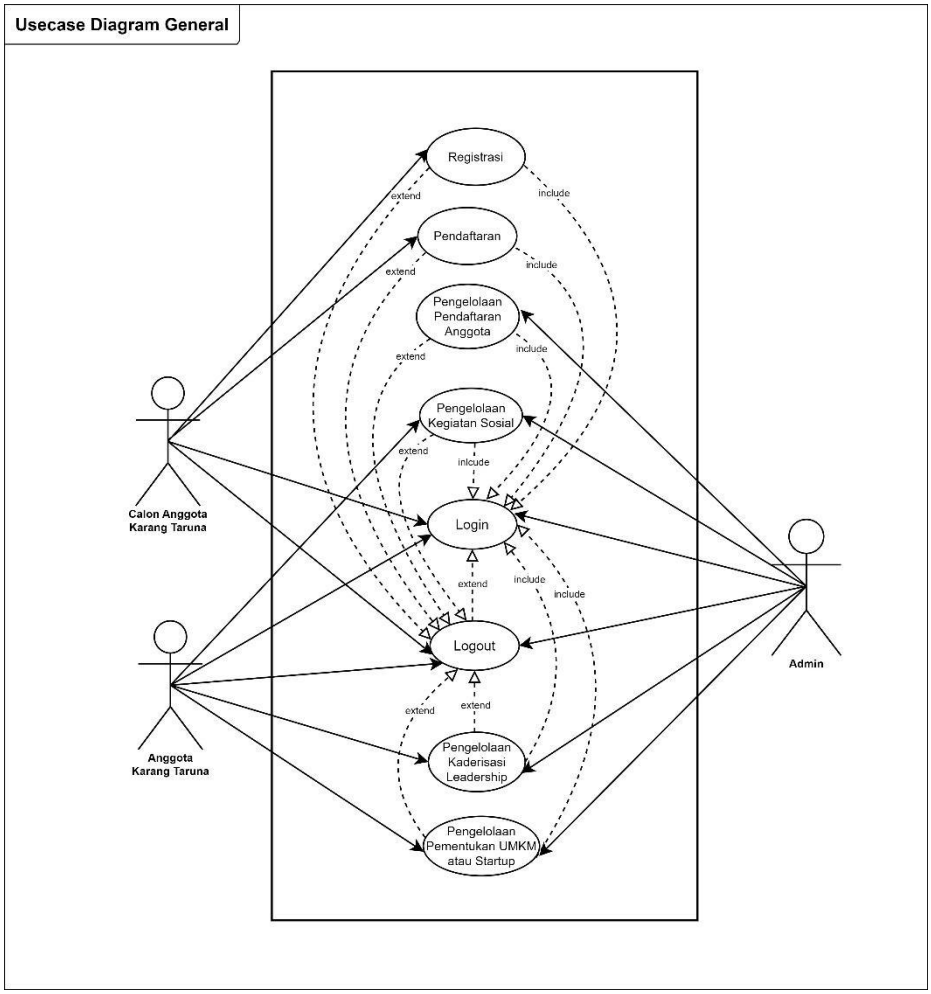

Figure 6. Use case diagram

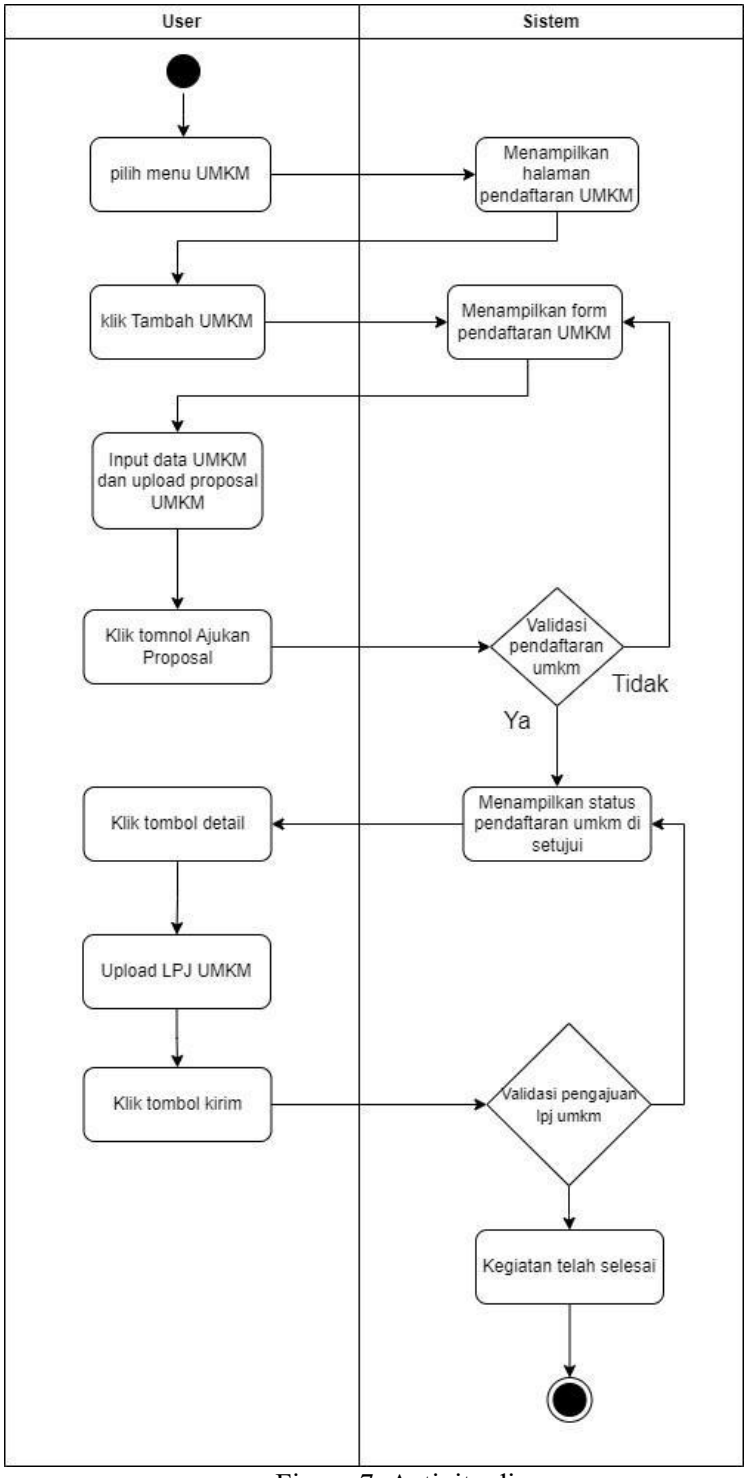

Figure 7. Activity diagram

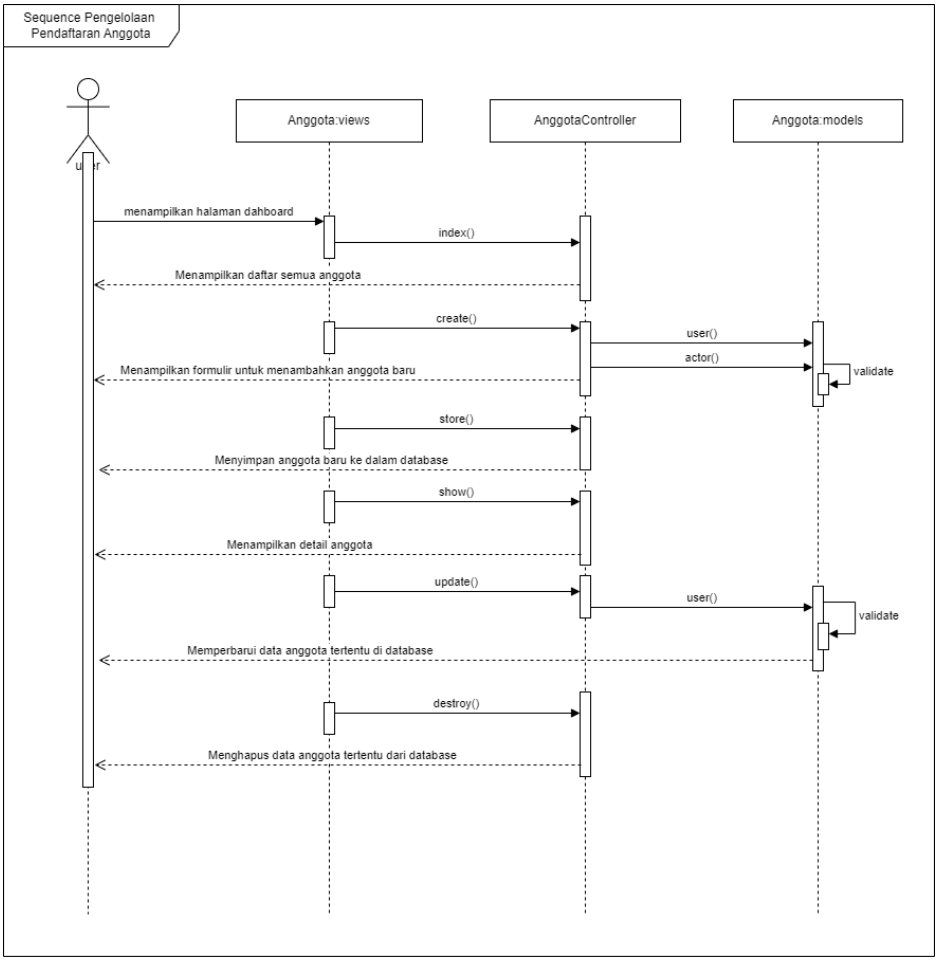

Figure 8. Sequence Diagram

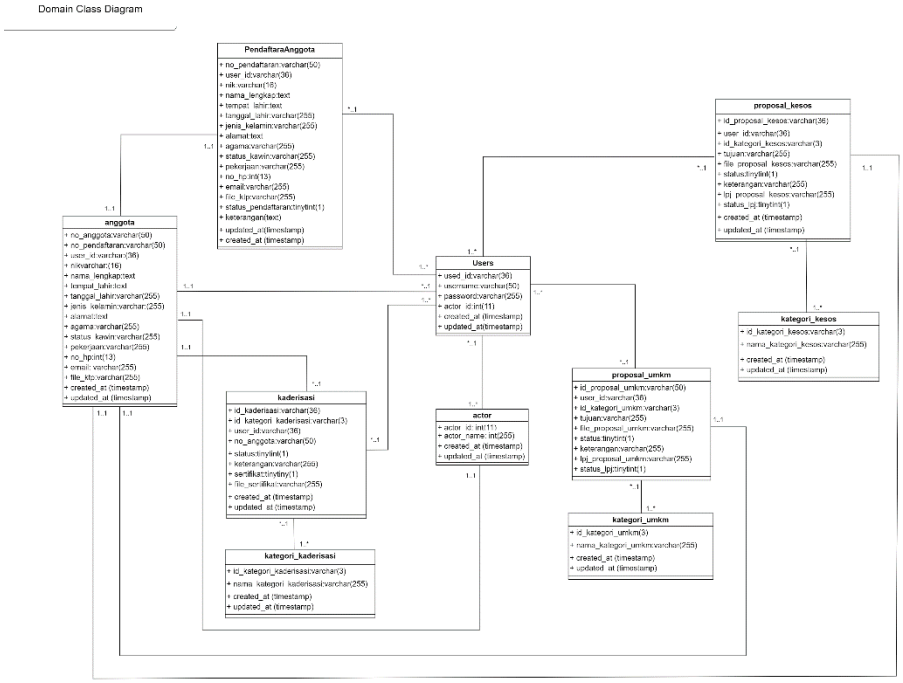

Figure 9. Class diagram

4. **System Development:**
   a. Implementation of the Laravel framework for back-end development.
   b. PHP (Hypertext Preprocessor) for dynamic web processing.
   c. MySQL as the relational database management system.
   d. HTML, CSS, and JavaScript for front-end interface design.

5. **Testing and Evaluation:**
   a. Unit Testing: Testing individual components of the system.
   b. Integration Testing: Verifying interactions between different modules.
   c. User Acceptance Testing (UAT): Evaluating the system with Karang Taruna members and administrators.
   d. Performance Testing: Assessing system response time and efficiency.

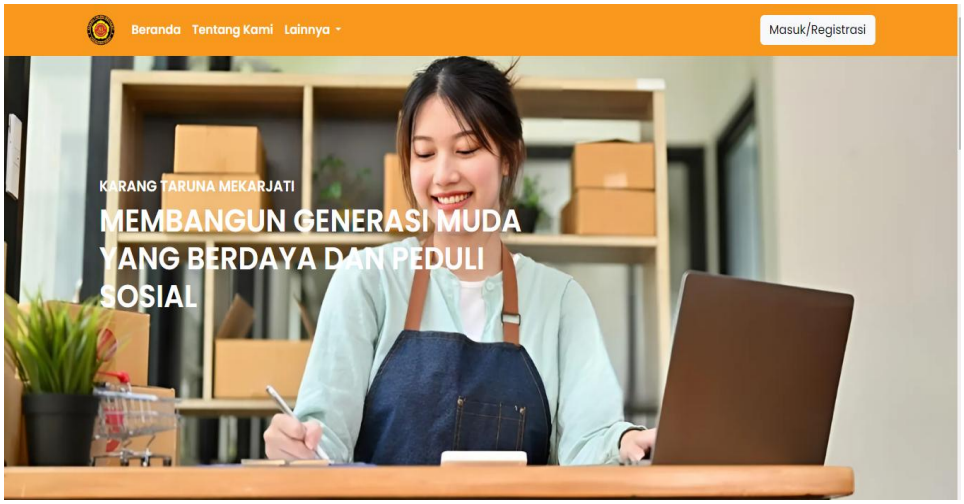

Figure 10. UI Beranda(home)

6. **Implementation and Deployment:**
   a. Hosting the system on a cloud server for accessibility.
   b. Conducting user training for Karang Taruna administrators and members.
   c. Continuous monitoring and maintenance for long-term usability.

III. Results and Discussions

This section presents the findings from the development and implementation of the "Youth Innovation Village" system. The results are evaluated based on system functionality, performance, and user feedback.

1. System Implementation and Features

The "Youth Innovation Village" system was successfully developed and implemented using the Laravel framework, PHP, MySQL, and BPMN-based process modeling. The system was deployed on a cloud server to ensure accessibility and scalability.

The main features of the system include:

a. Membership Registration Module

1) Users can register online and receive digital membership IDs.
2) Admins can verify and manage member data efficiently.

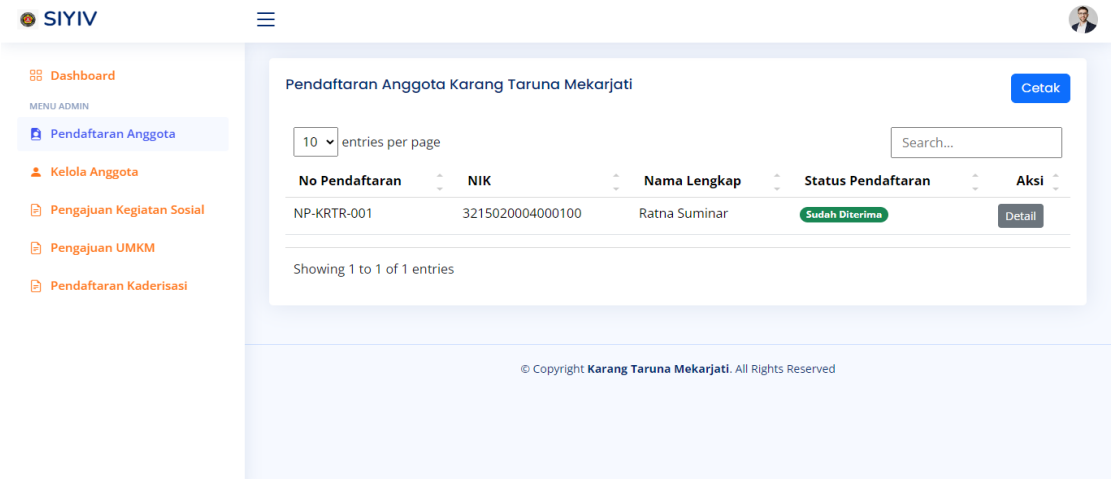

Figure 6. Screenshot of Membership Registration Module

b. Event Management System

1) Organizes and tracks social events, leadership training, and business development programs.
2) Members can sign up for activities through the platform.

Figure 7. Screenshot of Event Management Module

c. Startup and MSME Monitoring Module

1) Provides a dashboard for tracking startup progress and MSME activities.
2) Enables mentorship and networking opportunities.

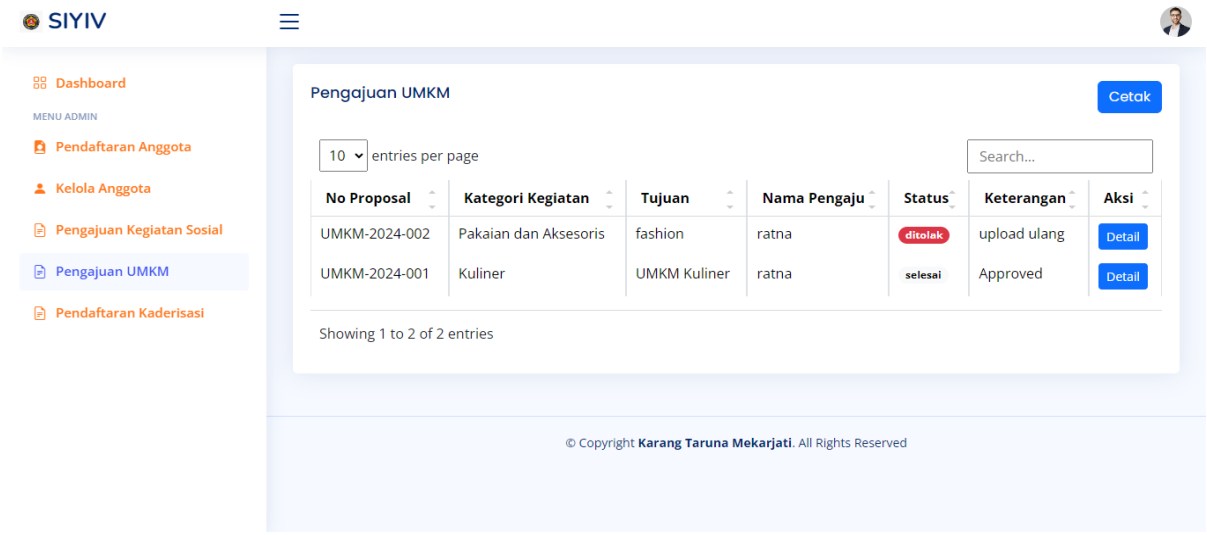

Figure 8. Screenshot of start-up and MSME monitoring Module

d. Administrative Dashboard

1) Allows Karang Taruna administrators to oversee all organizational activities.
2) Provides real-time analytics and report generation for decision-making.

e. Communication and Announcement System

1) Facilitates direct communication between members and administrators.
2) Features an announcement board for important updates.

2. System Performance Evaluation

a. Functional Testing

The system underwent unit testing, integration testing, and user acceptance testing (UAT). Results showed:

Table 1. Functional Testing

Test Type	Success Rate (%)	Issues Encountered
Unit Testing	98%	Minor UI alignment issues
Integration Testing	95%	Some delays in data synchronization
User Acceptance Testing (UAT)	93%	Users requested additional search filters

The membership registration and event management modules functioned smoothly, demonstrating seamless user interactions and efficient data processing. Users found the registration process intuitive, allowing for quick and hassle-free onboarding. Additionally, the startup monitoring feature was well-received, as it provided valuable insights into business development within Karang Taruna Mekarjati. However, feedback indicated a need for additional filtering options to enhance data retrieval and streamline navigation. Furthermore, some UI improvements were suggested to enhance accessibility and user experience, ensuring that all members, including those less familiar with digital platforms, could efficiently utilize the system.

b. Performance Testing

The system's performance was measured based on response time, scalability, and concurrent user handling.

Tabel 2. Performance Testing

Parameter	Expected Value	Measured Value
Page Load Time	< 2 seconds	1.5 seconds
Concurrent Users	100+ users	150 users successfully handled

Data Processing Time	< 3 seconds	2.2 seconds

The system performed within acceptable parameters, ensuring fast response times and smooth user interactions.

3. User Feedback and Satisfaction

A survey was conducted among Karang Taruna Mekarjati members and administrators after system deployment. 85 respondents participated, providing the following feedback:

Tabel 3. User Feedback and Satisfaction

Evaluation Criteria	Satisfaction Level (%)
Ease of Use	92%
System Responsiveness	89%
Feature Relevance	87%
Overall Satisfaction	91%

Users highly appreciated the intuitive interface and the ease of navigation, which allowed them to efficiently interact with the system without requiring extensive technical knowledge. The well-structured layout and user-friendly design contributed to a positive experience, enabling seamless access to various features. Additionally, administrators found the dashboard particularly useful for decision-making, as it provided real-time data and analytics, helping them monitor membership activities, events, and startup developments more effectively. However, some respondents suggested the addition of a mobile app version to improve accessibility, ensuring that users could engage with the platform conveniently from their smartphones, particularly those who rely more on mobile devices than desktop computers.

4. Discussion: Comparison with Manual System

Before digitalization, Karang Taruna Mekarjati relied on manual record-keeping, paper-based registrations, and fragmented communication, leading to inefficiencies. The new system streamlined operations and introduced real-time monitoring, data automation, and centralized information management.

Table 4. Comparison with manual system

	Manual System	Digital System (Youth Innovation Village)
Membership Management	Paper-based, slow processing	Online, instant verification
Event Registration	Manual sign-ups, prone to errors	Automated, real-time updates
MSME & Startup Tracking	Limited visibility	Digital dashboards & analytics
Communication	WhatsApp/manual calls	Centralized announcement system
Data Storage	Physical records, high risk of loss	Secure cloud-based database

The findings align with previous research on digital transformation in social organizations (Goyal & Sergi, 2021; Lee & Kotler, 2022), reinforcing that technology adoption improves efficiency, transparency, and engagement.

5. Challenges and Limitations

Despite its success, the system faced some challenges:

a. User Adaptation Issues: Some members, especially older users, required training to navigate the platform.

b. Limited Initial Features: Additional functionalities, such as mobile support and financial tracking, were suggested by users.

c. Internet Dependency: The system requires a stable internet connection, which could be a limitation in remote areas.

6. Future Work

To address current limitations and further improve the system, future research and development should focus on:

a. Mobile Application Development: To increase accessibility and engagement.
b. Financial Management Features: For tracking donations and event budgets.
c. Machine Learning for Data Insights: To predict event attendance and optimize resource allocation.

IV. Conclusions

This study successfully designed and developed the "Youth Innovation Village" system to support the digital transformation of Karang Taruna Mekarjati. The system was built using the Laravel framework, PHP, MySQL, and BPMN-based process modeling, with an iterative development approach following the Agile Scrum methodology. The research addressed the inefficiencies of manual administrative processes within Karang Taruna, particularly in membership registration, event management, leadership training, and MSME/startup monitoring. By implementing this digital system, the organization experienced significant improvements in operational efficiency, data accuracy, and member engagement.

The system's functional testing, performance evaluation, and user feedback analysis demonstrated its effectiveness. Results from unit testing, integration testing, and user acceptance testing (UAT) showed that the core functionalities, such as membership registration and event management, performed smoothly, while minor improvements were needed in startup monitoring filters and UI accessibility. Additionally, performance testing indicated that the system efficiently handled concurrent users and real-time data processing, ensuring reliability for organizational use.

User feedback highlighted high satisfaction levels, with 92% of respondents finding the system easy to use, 89% satisfied with its responsiveness, and 91% expressing overall approval. Administrators particularly benefited from real-time analytics and centralized data management, which streamlined decision-making processes. However, some users suggested enhancements, including a mobile application for better accessibility and expanded financial management features to support Karang Taruna's economic initiatives.

Comparing the manual system with the digital system, the findings confirmed that the new platform significantly improved workflow efficiency, data security, and organizational communication. The centralized dashboard, automated membership tracking, and integrated event management replaced manual record-keeping and fragmented communication, reducing errors and delays. This aligns with previous studies emphasizing digital transformation in non-profit organizations, reinforcing that technology adoption enhances transparency, engagement, and operational effectiveness.

Despite the positive outcomes, challenges remain, such as user adaptation for less tech-savvy members, dependency on stable internet connections, and the need for further system enhancements. Future research and development should focus on:

1. Developing a mobile application to improve accessibility and engagement.
2. Implementing financial tracking features to support budget planning and fundraising initiatives.
3. Leveraging AI and data analytics to predict event participation and optimize resource allocation.

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