

# A VILLAGE MONOGRAPH INFORMATION SYSTEM MODELING: CASE STUDY MARTAPURA SUB-DISTRICT, SOUTH SUMATERA, INDONESIA

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## ABSTRACT

Village monographs are data collection carried out by the village government that is systematic, complete, accurate, and integrated in the administration of government. In Indonesia, one of the local government agencies that are obliged to update their monograph data are villages in the Martapura District, Ogan Komering Ulu Timur Regency, South Sumatra Province. The village monograph aims to make it easier for the government, community or interested parties to obtain data and information from an area, especially village data contained in the Martapura sub-district. In this case, a data and information management model is needed to manage village data which encourages researchers to build a monographic information system. This research focuses on the development of a village monograph information system model which is implemented using a software prototype. The strategy and contribution in this research is the creation of a village monograph information model that can inform all existing village potentials using the Research and Development (R&D) method, while the application prototype development uses the Unified Process (UP). The modeling system used in this study is shown in the form of a UML diagram consisting of activity diagrams, entity relationship diagrams, and use case diagrams, the results of this study are presented in the form of data in the form of village monographs in the Martapura sub-district, Ogan Komering Ulu Timur Regency which are listed in government website, so that the data presented can be reprocessed and can be updated at any time.

**Keywords:** *Monograph, Modeling, Information System, Unified Process, Information Model*

## 1. INTRODUCTION

The Village monograph data and information systems for the central and regional governments are very useful as a measuring tool for planning and evaluating the performance of government services, facilitating development and community development. The work procedure for managing village profile data and monographs in the local government is attempted to carry out a transformation process towards an IT-based region (City/Village/District) and is directed to develop an information culture towards the realization of an information society.

A village monograph is a collection of data carried out by the village government which is arranged in a systematic, complete, accurate, and integrated manner in the administration of government [1]. Through this transformation

process, we can optimize the use of IT advancements to eliminate bureaucratic organizational barriers in the process of collecting profile data and monographs, as well as establish a network of management systems and work processes that enable government agencies in the work area of local government to work in an integrated manner and access village profile and monograph data that have been provided.

Administratively, Ogan Komering Ulu Timur Regency (East OKU), South Sumatra Province consists of 20 sub-districts. One of the sub-districts is Martapura, in which there are 9 (nine) villages, 7 (seven) sub-districts and 67 (sixty-seven) hamlets [2]. The government's policy to oversee equitable development since the implementation of regional autonomy (Law No. 22/1999 which was amended to become Law No. 32/2004 on regional government) through the Minister of Home Affairs

Regulation no. 13. The year 2012 (Permendagri No.13/2012) concerning monographs for villages/sub-districts and Permendagri No.12/2007 concerning guidelines for compiling and utilizing village and sub-district profile data. Whereas to know an accurate, comprehensive, and integral description of the potential and level of village development, it is necessary to prepare village and sub-district profile data, village and sub-district profile data need to be utilized to encourage the development of self-help and self-help villages to become self-sufficient villages.

Utilization of village profile data and monographs is used to determine the characteristics of potential resources, the development of all development sectors [3]. Therefore, government projects should be evaluated to identify the causes of resulting changes, flaws, and irregularities [4], as well as development problems in each village and sub-district, as a guide in determining the direction of village and sub-district development following the typology of potential and community development.

The results of the evaluation of the success of development activities every year will determine the rate of village development in the categories of fast developing, developing, slow-developing, and less developed. Furthermore, the results of the analysis of the rate of village development every year are used to measure the level of village development every five years in the classification of self-sufficient, self-sufficient, and self-help villages. In Indonesian local governments, the evaluation mechanism is carried out by analyzing the performance of the service based on several indicators. Refer to the Minimum Service Standards (SPM) and Key Performance Indicators (KPI) in accordance with Government Law Number 6 in 2008 [5].

Good information management in village government will increase the ability of the community and all other stakeholders to manage all the potential contained in a village. In addition, through this research, village information management using a monograph information system model can help improve the quality of decision-making at all levels of government management.

In this research, the purpose was to identify, analyze and develop a model of a village monograph information system, and to make a prototype of a web and mobile-based village monograph information system application. The

problem is formulated what are the main data needed in the village monograph information system model in Martapura district, how the village monograph information system is managed properly, and how to develop and implement a prototype village monograph system application in Martapura district. So that the limitation of the problem in this study is the modeling designed from village data obtained in the Martapura sub-district only in the form of a prototype which is implemented in the government website display so that through the modeling it is expected to generate benefits in increasing the empowerment of villages, especially in Martapura sub-district, East OKU (Ogan Komering Ulu) Regency, South Sumatera, Indonesia.

## 2. LITERATUR REVIEW

The use of models is an important factor in building a system, modeling is the main resource in a company. Product design and the use of information technology are closely related to product design activities. Several modeling standards have been implemented, including UML modeling [6][7], which is used as an analytical procedure in industrial design, and project modeling using software and business processes [6].

The model is a simplified representation of real events, so a validation and verification process is needed to determine the accuracy of the model in examining the existing problems. In general, the model is used to provide an overview, explanation, and forecast of the reality was studied. In general, modeling is used to provide an overview, explanation, and forecast of the reality under study one form of modeling that uses Group Decision Making (GDM) and Group Decision Support System (GDSS) to evaluate government performance in a village and display it. in the form of integrated information [7].

From several previous studies, no integrated village monograph management system model has been found, so that the prototype model built can be used for villages in other local governments based on the reference to ministerial regulations (Permendagri No. 12 of 2007 concerning village profiles and No. 13 of 2012 concerning village monographs), besides that the resulting prototype form is also only web-based and does not support mobile-based. Utilization of Information and Communication Technology (ICT) in managing village profile data and monographs in local

governments is the right policy to improve the performance of village working groups.

## 2.1 Unified Process

Unified Process (UP) is an object-oriented system development method developed by Rational Rose, part of IBM [9]. The main feature of this method is that it uses a use-case-driven and iterative approach to the software development cycle [10]. UP is appropriate to use when developing object-oriented software with a focus on UML (Unified Modeling Language).

Integrated Processes are based on improving and refining the system through multiple iterations, with cyclic feedback and adaptation. The system is developed gradually over time, iteration by iteration, with this approach also known as iterative and incremental software. The iterations are spread over four phases where each phase consists of one or more iterations [11][12]:

The first phase of Inception, which is the first and shortest phase in the project. It is used to prepare the basis for the project, including preparation of business cases, establishing scope and setting boundaries, outlining key requirements, and possible architectural solutions together with design trade-offs, identifying risks, and initial project development, etc. schedule plan with main management and cost estimate. if the initial phase lasts too long, it is like an indicator stating that the vision and objectives of the project are not clear to stakeholders. Without a clear goal and vision, the project is likely to fail. In this scenario, it is better to take a break at the beginning of the project to refine the vision and goals. Otherwise, it can lead to unnecessary changes and delays in the existing schedule phase.

In the second phase of the Elaboration, during this phase, the project team is expected to be able to fulfill most of the system requirements (for example, in the form of using UML Topology Modeling), to carry out risk analysis and create risk plans management to reduce or eliminate schedules in final and product schedules, to establish the design and architecture (e.g., using basic class diagrams, package diagrams, and deployment diagrams), to create plans (schedules, cost estimates, and achievable promotions) for the (construction) next.

The third phase of construction, which is the longest and largest phase in the Unified Process.

During this phase, the system design is finalized and refined and the system is built using the foundation created during the elaboration phase. The construction phase becomes multiple iterations, for each iteration to produce an executable system release, the final iteration of the construction phase releases the fully completed system to be used during the transition phase.

The final phase is Transition, which is the final project phase that delivers the new system to its end users. The transition phase also includes data migration from legacy systems and user training.

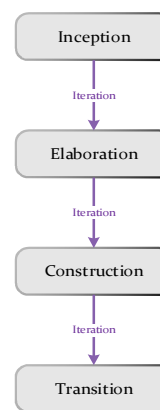


Figure 1: Unified Process Model

Each phase and iteration consists of predetermined activity expectations. Integrated Processes describe work activities as disciplines. A plane is a set of activities and related artifacts within a single subject area (e.g. activities in needs analysis). The disciplines described by the Unified Process are as follows [11]:

- a) Business modeling, object domain modeling and dynamic modeling of business processes,
- b) Requirements, analysis of the requirements of the system under consideration. Includes activities such as writing use cases and Identification of national requirements,
- c) Analysis and design, covering design aspects, including total Architecture,
- d) Implementing, programming, and building systems (except deployment),
- e) Testing involves testing activities such as test planning, test scenario development, alpha, and beta testing, regression testing, acceptance testing, and

- f) Deployment, activity deployment system developed.

## 2.2 Village Monograph

A village monograph is a collection of data carried out by the village government which is arranged in a systematic, complete, accurate, and integrated manner in the administration of government [1]. In Permendagri No.13/2012, it is defined that a village or what is referred to by another name, hereinafter referred to as a village, is a legal community unit that has territorial boundaries that are authorized to regulate and manage the interests of the local community, based on origins and customs. recognized and respected in the system of the Government of the Unitary State of the Republic of Indonesia.

In 2005 The Ministry of Home Affairs proclaimed that the number of towns in Indonesia has arrived at 82,353 spread more than 560 locale/urban communities furthermore, 34 areas with various qualities [3]. Village Government is the administration of government affairs by the Village Government [13] and the Village Consultative Body in regulating and managing the interests of the local community based on local origins and customs that are recognized and respected in the system of Government of the Unitary State of the Republic of Indonesia.

The village head is the person who is always informed about the implementation of improving the political, financial, social, and social conditions. Some villages have put forward various efforts to work on this administration, especially those marked by increasing the capacity and capacity of village organizations through the use of data innovation but in small numbers [3].

As per Indonesia's main guidelines, each village has a resident affiliation called RW and each RW has an environmental affiliation called RT [3]. Functionally because of regional benefits, village heads have to serve various administrations including regulatory, monetary, security, and government social assistance administration. In addition, supporting the implementation of the obligations and elements of each village requires clear information and data depending on the quality of the village.

Regarding and display of data, at the village level information is generally introduced in monograph view as a table. The tables contain information officially related to village improvement. Village information as a whole, integrated, precise, and responsible for its reality which includes general information, individual information, authority information, monetary information, and institutional information.

Ogan Komering Ulu (OKU) Timur Regency is one of the regencies in South Sumatra Province in Indonesia with an area of 3,370 km<sup>2</sup> with the capital city of this regency located in Martapura which is inhabited by people with various multi-ethnic tribes with indigenous Komering tribes then there are Javanese, Ogan, Balinese, and several tribes. others in the archipelago, however, live in harmony full of very thick kinship.

At the beginning of its establishment, East Ogan Komering Ulu Regency consisted of 10 sub-districts, 199 villages, and 3 sub-districts, and currently, East OKU has 20 sub-districts, 305 villages, 7 sub-districts, and 20 preparatory villages [14]. The topographic map for East OKU shows in Figure 1.

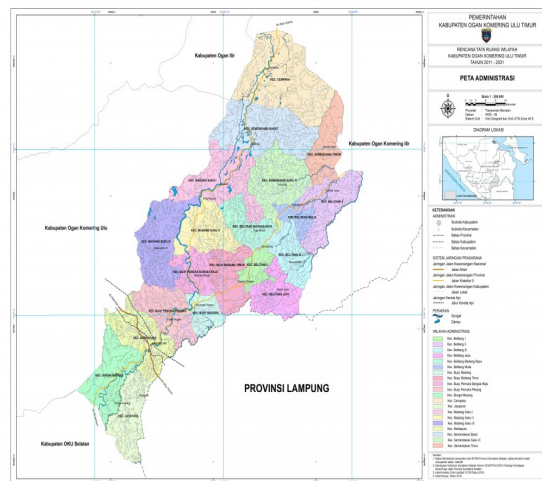


Figure 2: East OKU Topographic Map [14]

An open problem that often occurs in several sub-districts in the province of South Sumatra, Indonesia, related to the village monograph is the lack of information provided by the village government or local community regarding the resources contained in the village, including village population data, resulting in a lack of information.



the interest of people from outside the region to visit the village and also make it difficult for assistance to be obtained from the central government to the local community. So that through a village monograph it should be able to provide more information to interested parties in order to attract tourists and access from the government.

### 3. RESEARCH METHODOLOGY

This research will be conducted in 2 (two) stages, in the 1st year, and the 2nd year. In the first year, research activities focus on the analysis and study of the development of a complete village monograph information system model. The second-year is the stage to develop a prototype of a web- and mobile-based village monograph information system. This software is designed to produce complete village monograph information that is easily accessible to all stakeholders.

The hypothesis in this study is the establishment of a village monograph information system model by applying the UML modeling adopted from the Unified Process so the result can be implemented on government websites to present data and information related to existing resources to the community and interested parties.

Based on the research circle in Figure 3, the process of this research cycle is to look for problems that occur in Ogan Komering Ulu Timur Regency, namely the village monograph contained in the district, one of which is the Martapura sub-district, there are several villages in the sub-district whose information has not been published in general so that the public it is difficult to access these areas and know the forms and government programs contained in each village. Next is the stage of searching for literature that supports research on village monograph information systems, then is designing the right method to build the system, in this research the unified process method is implemented for system implementation and development, next is the analysis stage on experiments conducted for system development, and the next stage is publication and citation.

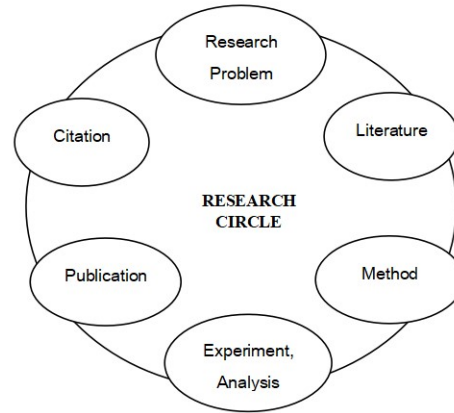


Figure 3: Research Circle

The village monograph information system model is compiled and designed based on the data and studies that have been produced, and the output is a web and mobile-based village monograph application prototype. Beginning with developing a theoretical model of a monographic information system. This model was then tested with field data obtained from survey results, observations, and application development results. Figure 4 is a Fishbone diagram of the research flow that summarizes the overall activities of this research.

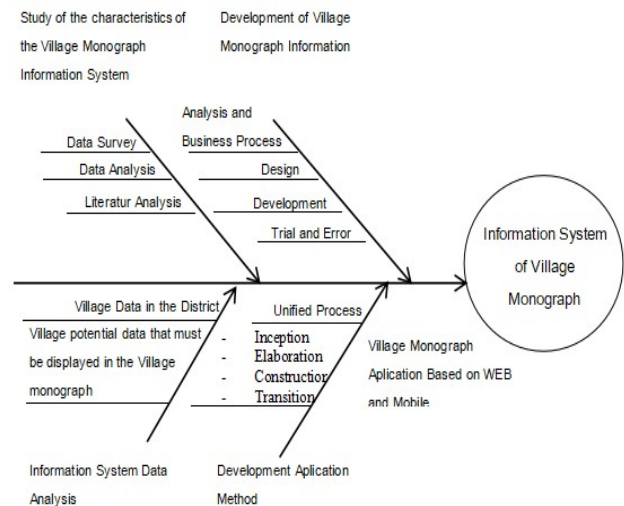


Figure 4: Fishbone Diagram of The Research Flow

Based on the fishbone diagram in Figure 4, to study the characteristics of the village monograph information system, survey data is needed, then data analysis from the survey results and analysis of the literature obtained as research support. The next stage is to analyze the data information system, the

data analyzed is in the form of detailed data about the village and statistical data such as population, employment, education which will be displayed in the village monograph system, the next step is the application development stage using the unified process method, through At this stage, a system will be designed based on the stages of the unified process, namely inception, elaboration, construction, and transition.

The next stage is the development of a village monograph information system by conducting analysis and business processes, system design, system development, and trial and error trials. Through these stages, a village monograph information system will be formed in the Martapura sub-district, Ogan Komering Ulu Timur district, South Sumatra province based on a website and mobile application.

The following table shows the demographic data for the Ogan Komering Ulu Timur district in the form of a table that presents information related to the total population, area, and total population density measured based on the number of people per area in units of Person/Km<sup>2</sup>. The results of the demographic table information will be made in the form of pie charts and bar charts shown in Figures 4 and 5.

Table 1: Village Demographic [15].

No	District	Total Population	Area (Km <sup>2</sup> )	Population Density (Person/Km <sup>2</sup> )
1	Martapura	50.095	102,16	261
2	Bunga Mayang	16.481	113,54	85
3	Jaya Pura	12.103	230,17	76
4	Buay Pemuka Peliung	32.793	154,13	196
5	Buay Madang	37.133	114,36	460
6	Buay Madang Timur	55.617	156,25	390

7	Buay Pemuka Bangsa Raja	11.502	192,95	111
8	Madang Suku II	29.679	129,34	122
9	Madang Suku III	24.630	195,32	147
10	Madang Suku I	35.395	211,25	154
11	Belitang Madang Raya	42.491	163,59	617
12	Belitang I	52.557	354,5	283
13	Belitang Jaya	18.942	91,97	152
14	Belitang III	34.284	153,87	313
15	Belitang II	41.357	153,59	722
16	Belitang Mulya	20.659	45,97	156
17	Semenda wai Suku III	38.335	297,77	176
18	Semenda wai Timur	34.021	183,27	245
19	Cempaka	26.288	101	89
20	Semenda wai Barat	20.338	225	51
<b>Total</b>		634700	3370	4806

Based on the existing conditions, the population of OKU TIMUR Regency is recorded at 634,700 people with the largest population in the District in East Buay Madang District, which is 55,617 people, while the lowest population is in Buay Pemuka Bangsa Raja District with a population of 11,502 people with a density of 186 km<sup>2</sup> [15].

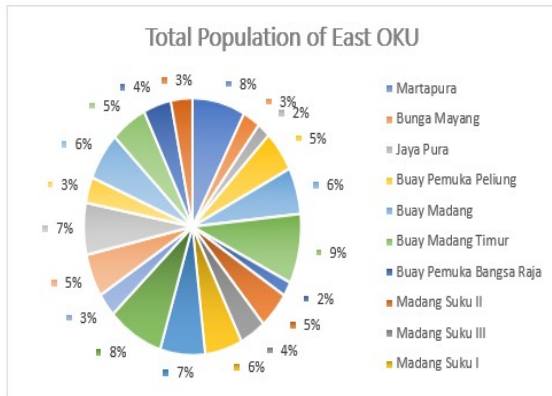


Figure 4: Total Population Chart of East OKU

Based on the results of the pie chart shown in Figure 4, the highest total population is obtained by Buay Madang Timur sub-district with a percentage of 9% population density and the lowest is Buay Pemuka Bangsa Raja with a population density of 2%. Based on the pie chart, the Martapura sub-district itself has a population density of 8% with a total population of 50.95 people with an area of 102, 16 and the total population per area is 261 Person/Km<sup>2</sup>. The diagram of the area and population per region will be shown in Figure 5.

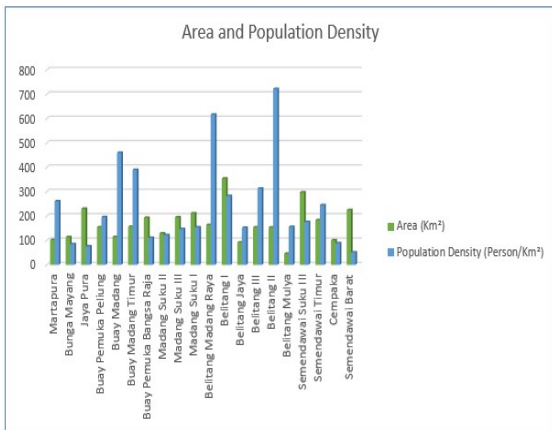


Figure 5: Area and Population Density of East OKU

From the area diagram shown in Figure 5, the highest area data is found in Belintang 1 sub-district with an area of 354.5 Km<sup>2</sup> and the largest total population per area is in Belintang 2 sub-district with a total population per area of 722 Person/Km<sup>2</sup>. The densest distribution of the population by area is the West Semendawai sub-district, while the Martapura

sub-district has an area of 102.16 Km<sup>2</sup> with a total population per area of 261 Persons/Km<sup>2</sup>.

Based on the demographic information of the area in the Ogan Komerang Ulu Timur district, a demographic information system will be designed for the Martapura sub-district which includes the villages in the area, so that the designed information system will be implemented in the form of an application that can be used by the Martapura sub-district government and accessible to the general public.

### 3. MODEL SYSTEM

The system model presented in this study is a UML diagram adopted from the Unified Process method. The UML diagram formed to build a village monograph information system is the activity diagram shown in Figure 6.

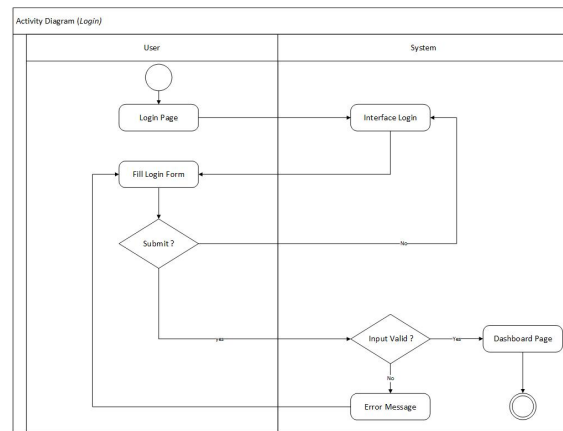


Figure 6: Activity Diagram (Log in)

In the activity diagram shown in Figure 6, there are two activities, namely the user and the system, in this case, the admin will act as a user who will access the login page when the user accesses the login page, the system will display the login interface page, then the system will provide a login page. login that must be given feedback by the user, the feedback given is filling out a form in the form of a user identity and password, if the user submits then the system will then check whether the data entered by the user is correct, if not, the user will be returned to the login interface page, If the user and password input on the login form is correct, the system will display the main administrator page (dashboard). If the input is incorrect, the system will display an error message.

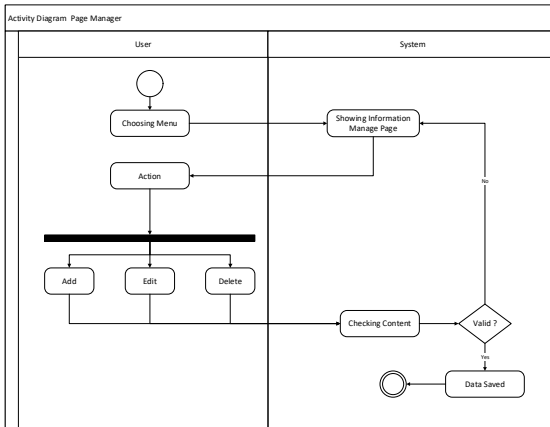


Figure 7: Activity Diagram (Manage Page)

In Figure 7 there are two activities, namely the user and the system, in this case, the admin will act as a user who will access the page management, when the user accesses the menu options, the system will display information about page management, then the system will provide feedback to the user in the form of actions that the user can take, such as adding pages, editing pages or deleting previously created pages, the feedback given will then be checked by the system, if the feedback data is valid then the processed data will be directly stored in the system. If the entry fails, the system will immediately return it to the main page for management.

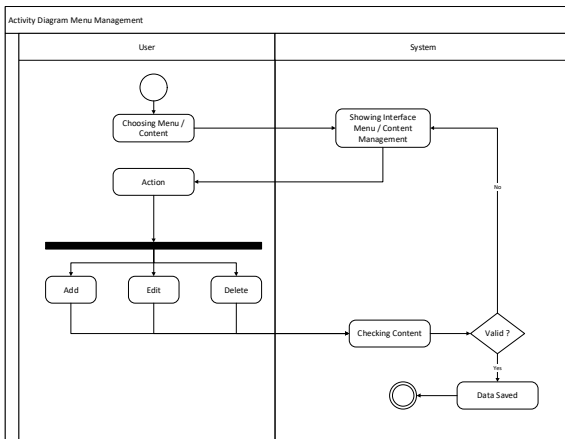


Figure 8: Activity Diagram (Choosing Menu / Content)

In the activity diagram shown in Figure 8, there are two activities, namely the user and the system, in this case, the admin will act as a user who will

access the menu management and selection of other content such as news, photos, sliders, albums, village officials, and synergy when the user accesses menu options or related content, the system will display information regarding the management of the page, then the system will provide feedback to the user in the form of actions that the user can take, such as adding pages or content, editing pages or content or deleting pages. or content that has been created previously, the feedback given will then be checked by the system, if the feedback data is valid then the processed data will be directly stored in the system, but if the entry fails, the system will immediately return it to the main page for re-management.

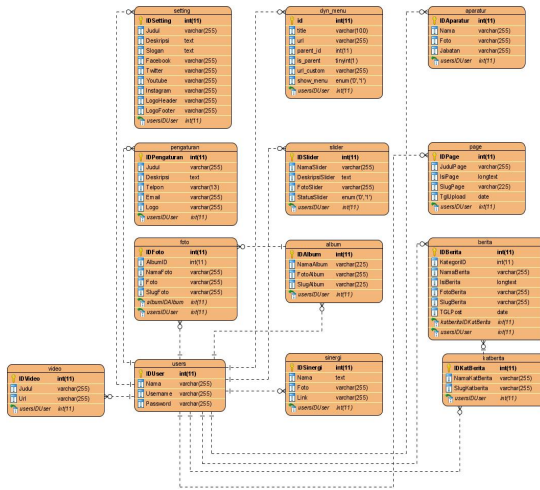


Figure 9: Entity Relationship Diagram

In the Entity-Relationship Diagram shown in Figure 9, the relationship between each class is obtained, among others, there are setting classes, menus, apparatus, sliders, pages, photos, albums, news, videos, users, synergies, and news categories, in each. The class consists of an ID with each data type shown in Figure 9. The entity-relationship in the diagram shows that the class is centered on the user which consists of IDs in the form of the name, username, and password. For more details, the entity-relationship diagram will be displayed in full on the journal attachment page.



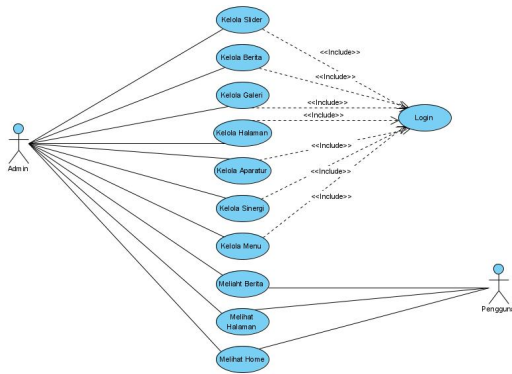


Figure 10: Use Case Diagram

In the use case diagram in Figure 10, two people act as actors who will manage the village monograph information system, namely there are actors as admins and there are actors as users, admins can manage website pages in the form of managing slider pages, news pages, galleries, main pages, apparatus, synergies, menus, viewing news, viewing pages, and viewing home views. However, the access that the admin does for the management requires a login system to improve security on the website so that not just anyone can manage the site. Meanwhile, users will be able to view news, view pages, information on the main page, and other information listed in the village monograph information system.

The use case diagram displayed in more detail will be shown on the attachment page in this journal. In the use case diagram 2 people act as actors who will manage the village monograph information system, namely there are actors as admins and there are actors as users, admins can manage website pages in the form of managing slider pages, news pages, galleries, main pages, apparatus, synergies, menus, viewing news, viewing pages, and viewing home views. However, the access that the admin does for the management requires a login system to improve security on the website so that not just anyone can manage the site. Meanwhile, users will be able to view news, view pages, information on the main page, and other information listed in the village monograph information system. A more detailed view of the use case diagram will be shown on the appendix page of this journal.

#### 4. RESULT AND STRATEGIES

In this section, a preview of the system from the designs that have been made using a website-based application will be displayed. On the main view of the website or home page, there is a menu bar at the top consisting of the home menu, profile, village, potential, statistics, and village government. On this page, a slider image is displayed which is an image of an iconic or tourist place in the Martapura sub-district. In the application, the image displayed on the main page is the Pertajaya dam.

Furthermore, at the bottom, population statistics, photos, and videos are displayed on the profile of the sub-district. Then there is information on program synergies and the latest news related to the Martapura sub-district and its surroundings. On the right side of the page, government social media and profiles of village officials are also displayed.

At the bottom of the page, there is a map of the sub-district location and information on government addresses and social media icons that are directly linked to the social media accounts of the Ogan Komerling Ulu Timur district government, South Sumatra. On the menu bar on the main page of the website, there are sub-menus as follows. Profile page consisting of a) Village History, b) Geographical Location, c) Population, d) Customs and Culture, e) Organizational Structure and Duties.

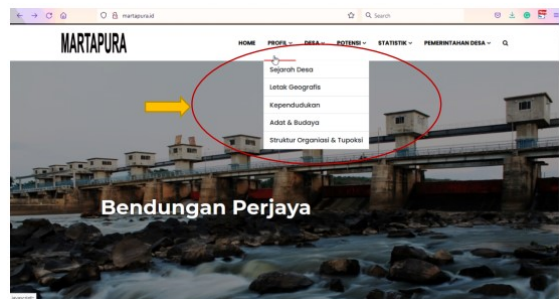


Figure 11: Main Page (Profile)

Village page consisting of; a) Ex. Martapura Hamlet, b) Ex. Sengkunyit Nails, c) Ex. Martapura Market, d) Ex. Terukis Rahayu, e) Ex. Tuha Jaya River, f) Ex. Bukit Sari, g) Tanjung Kemala, h) Kota Baru, i) Keromongan, j) Perjaya, k) Suko Mulyo, l) Kota Baru Barat, m) Perjaya Barat. As shown in the Figure 12.

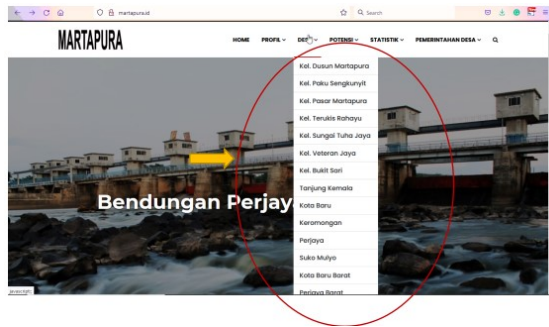


Figure 12: Main Page (Village Page)

The potential page consists of a) Potential for Tourism, b) Potential for Marine Sector, c) Potential for Trade, d) Potential for Agriculture, e) Potential for Industry, f) Potential for Education. Furthermore, there is a Statistics page which consists of several population data as follows: a) Education, b) Marital Status, c) Blood Type, d) Occupation, e) Religion, f) Social Class, g) Raskin, h) Jamkesmas, i) Family Hope Program, j) Head of Family, k) Malnutrition, l) Pregnancy, m) Migrant Workers, n) Assistance for Poor Students. Then there is the Village Deliberation page which consists of data from the Village Consultative Body and a news page containing the latest information or news around Martapura district and its surroundings.

From the figure 13, on the news page, there are news categories, namely general news and regional news, then there is a popular news column which is the news topic headline that is displayed on the website page. Then at the bottom of the news, there is information about the author of the news and links that can be shared on social media

## 6. CONCLUSION

The results of the identification and development of the village monograph information system model in this study were obtained village data in the Martapura sub-district, East OKU, from the local village government which in this study was processed and presented in the form of a prototype model by applying the unified process method which was implemented in UML diagram to be developed in the government information system website in Martapura district. The model provides a detailed description of the master program, parent class and derived class and the relationship between each entity for program development.

In the result of this research Based on the results of using the models, data obtained directly from the local government and the official website of the Ogan Komering Ulu district in Martapura District, South Sumatra Province, this website can be used for the local government as a village monograph that provides information about Martapura district and villages. - villages located in the Martapura sub-district in more detail both for the benefit of the government, society and in the field of science that can be related to various forms of research.

This village monograph information system in detail will present data in the form of village monographs in the Martapura sub-district, Ogan Komering Ulu Timur Regency. Through the design using the unified method, the village monograph information system process in the Martapura sub-district can be further developed both for the benefit of the government and the wider community, especially in the province of South Sumatra, Indonesia, so that the data presented can be reprocessed and can be updated at any time.

For further development, this research can be developed in the form of a mobile application, so that it can be accessed portable by the government and the community who need information about village monographs, this software is designed to produce complete village monograph information

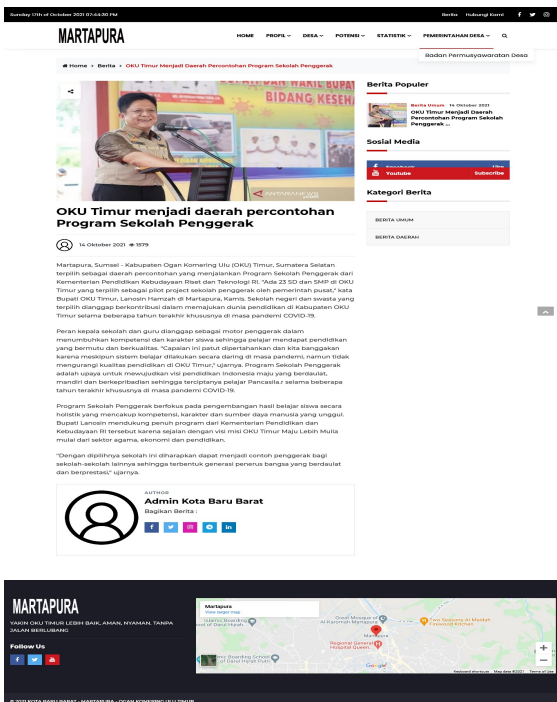


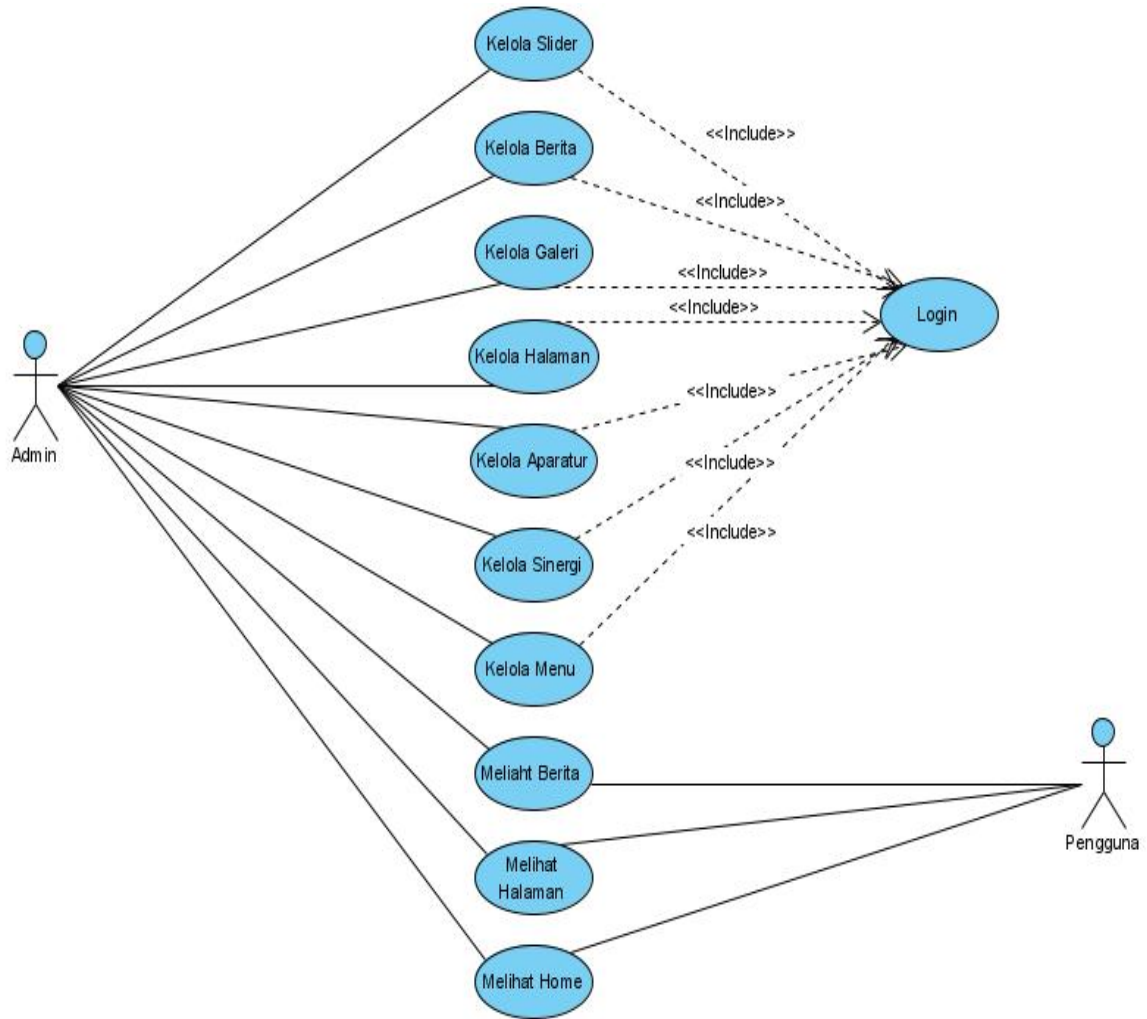
Figure 13: News Page (Full Page)

that is easily accessible to all stakeholders. . In addition, village information management using a monographic information system model can help improve the quality of decision making at all levels of government management.

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Attachment 1: Use Case Diagram





**Attachment 2: Entity Relationship Diagram**

