The Implementation of Knowledge Management System as the Basis for Public Services and Public Information in the Village Service Unit

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KEYWORDS	ABSTRACT
Village, Knowledge Management System (KMS), Information, Service, Public.	The current technological development is progressing rapidly. However, the implementation of this technological advancement is still not optimally applied in all areas, especially in rural areas. Therefore, the application of Knowledge Management System (KMS) is necessary. According to Law Number 6 of 2014 concerning villages, in section 3 of the Village Law, Article 86 on the village information system and rural area development, it is stated in the first point that villages have the right to access information through the village information system developed by the local government of the district/city. Currently, the problems that occur in villages are the lack of maximum service and information, the scarcity of village officials in managing computerized data, and the lack of systematic archiving. By implementing KMS, it can be a solution for public services and information, as well as data processing and correspondence in the village, so that the community will receive excellent services from the village government.

Introduction

Technological developments are currently growing very rapidly. However, the application of this technological development is still not optimally applied to all corners of the region, especially in the coastal village, Kec. Kuantan Mudik, Kab, Kuantan Singingi, Riau. The village is the smallest unit in government administration and often faces challenges in managing knowledge, information and public services. Limited human resources, limited technological infrastructure and lack of awareness of the village government and the community about the importance of knowledge and information can be obstacles in improving public services and information at the village level.

Therefore,*Knowledge Management System* (KMS) can be an effective solution to overcome these challenges. This KMS can assist villages in collecting, storing, organizing and distributing knowledge, information and public services more effectively and efficiently. With the KMS, villages can utilize and share their knowledge, so that people can easily access the information they need.

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In addition, the implementation of KMS can also facilitate collaboration between village government, communities and various other parties. With the various KMS*stackholder* can contribute in generating and sharing knowledge relevant to public services and information. This will strengthen community participation in developing the village.

Based on Law Number 6 of 2014 concerning villages [1] in part 3 of the Village Law article 86 concerning information systems for village development and development of rural areas, in the first point it is stated that villages have the right to access information through village information systems developed by district/city regional governments.

Therefore, this study aims to implement an effective KMS at the village level by considering the existing challenges. The results of this study are expected to contribute to improving public services and information in coastal villages as well as improving the quality of society in technological developments.

Based on the background that has been described, the identification of the problems from this research are: 1. It requires the application of KMS for public services at the village level. 2. The information that the public gets indirectly. 3. Lack of openness of public information to the community. 4. People find it difficult to get public services and information. 5. Village documents and archives are not well organized.

Based on the background that has been described, the problem formulation of this research is: 1. How is the application of KMS for openness of public services in coastal villages? 2. How to make long-term planning for the implementation of KMS in coastal villages? 3. What are the benefits of implementing KMS for openness of public services in coastal villages? 4. How to provide training to the staff in the coastal village service unit to be able to use the KMS effectively?

In accordance with the formulation of the problem above, this study aims to implement KMS to improve the quality of public services and information in coastal villages and help the government and the community collaborate to take advantage of current technological developments and also increase awareness of the community and village government about the importance of managing information and public services and the benefits obtained through the implementation of KMS.

Research methods

In this study using the Rational Unified Process (RUP) Methodology. The RUP method is a process-oriented activity development method. In this method, there are four stages, namely Inception, Elaboration, Construction, Transition [13]. RUP stages can be seen in Figure 1:
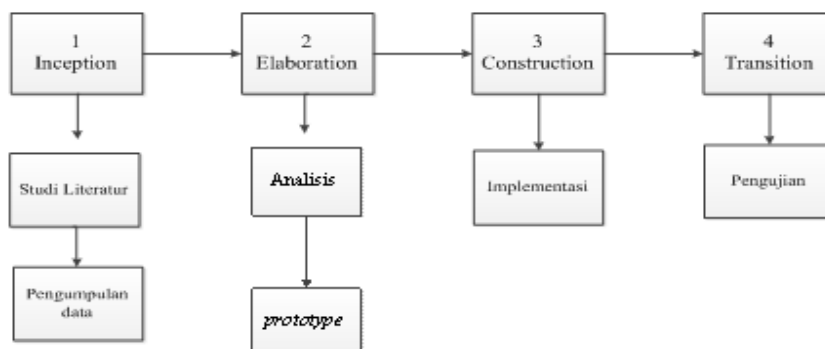

Figure 1. Unified Process Stages

At this stage the developer defines activity boundaries, analyzes user needs and performs the initial design of the architectural design and user case software. In Inception, there are several stages including:

Literature Study is a way to solve problems by exploring written sources that have been made before. In research that is about to be carried out, of course a researcher must have broad insight regarding the object to be studied. In this study, the study of literature included studying journals, books and interviews with village heads as well as reviewing systems related to KMS implementation and public information services.

Data collection methods are techniques or methods used by researchers to collect data. Data collection is carried out to obtain the information needed in order to achieve research objectives. Data collection methods are used to obtain information that will be needed in research.

The KMS design is carried out starting from specifying features to releasing a prototype of the KMS implementation for public services and information. The implementation of the KMS design that has been made is carried out at this stage. At the end of this stage, the final version of the KMS approved by the village head is released along with documentation for use. The stages in the Construction phase are implementation. Implementation is the KMS implementation stage that is made based on the results of the analysis and design of the previous system until the system created can be used in actual conditions according to the desired goals.

Results and Discussion

1. Phase Inception

During phase Inception, establishes the business basis for the system and limits the scope of the project. To achieve this, it must identify all external entities that will interact with the system (actors) and define the nature of these interactions in general terms. This involves identifying all use cases and describing some of the significant ones. The business baseline includes success criteria, risk assessment, estimates of required resources, and a phased plan indicating key milestone dates.

In analyzing and designing a good KMS, appropriate data and information are needed and in accordance with the needs of KMS implementation. This can be obtained by analyzing the needs of the process that is currently running in the coastal village first, so that it can be analyzed what needs are factors or needs for making KMS.

2. Phase Elaboration

The goal of the phase *elaboration* it is to analyze the problem area, develop an application plan and eliminate the highest risks of creating a KMS.

a. Running System Analysis

Analysis of the running system is needed to find out the initial procedures in the case under study so that KMS can be created or implemented.

In implementing the current system, people receiving public services and information must come to the village office or village officials come to residents' homes to deliver letters or announcements. In this way, public services and information will be accepted by the public slowly or for a long time.

b. KMS Making Analysis

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In application development, a needs analysis is carried out for making KMS, this KMS system is a web-based application. This application will run in the browser. The output of this application is the implementation of KMS for coastal villages. The users of this application are the coastal village community and the coastal village apparatus. In this application there is a home menu, news, announcements, reporting, discussion forums, LMS, Contact. The following is an explanation of these features:

1. Home page
2. News
3. Announcement
4. Reporting
5. discussion forum
6. MSMEs
7. Religion
8. Course
9. Tourism and culture
10. Contact

c. Analisis Unified Modelling Language (UML)

UML (*Unified Modeling Language*) is one of the most widely used language standards in the industrial world to define requirement, make analyses and design, and describe the architecture in object-oriented programming

Design analysis on this system uses UML, which consists of *Use case Diagram* and Activity *Diagram* application.

Use Case Diagram

Use case diagram is an activity that describes the process in the system. *Use case diagram* is found in the following picture:
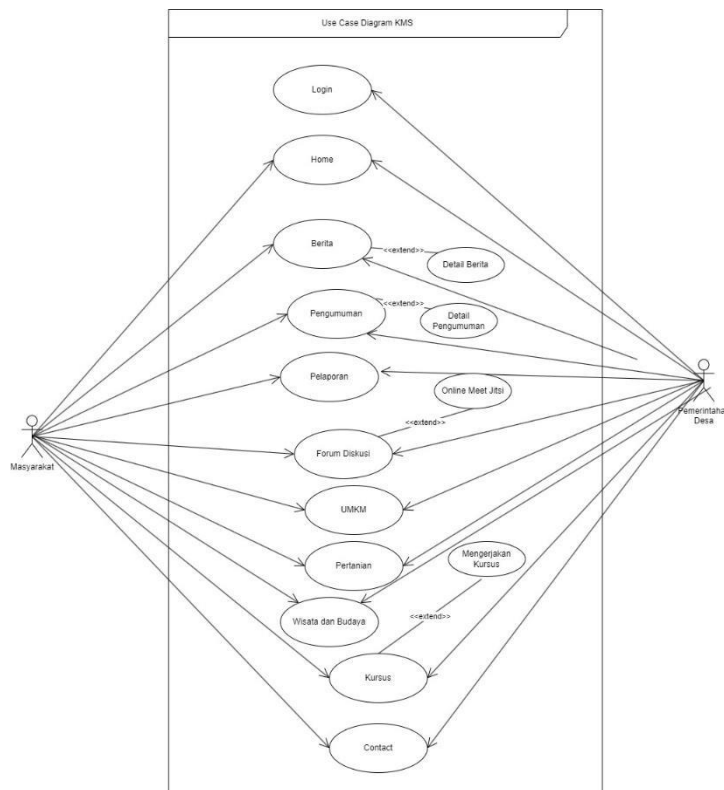

Figure 2. Use case Diagram

Based on Figure 2 above, it can be seen that the system has 2 actors and 12 *use case*.

1. Following are the specifications of *use case diagram login*

Table 1. Login Specifications

Information	Explanation
Actor	Village Administration
Use Case	Login
Description	Users log in to the system before carrying out activities on the system
Pre Condition	Displays the System Login Form
Post Condition	Village Administration system login successfully
Basic Flow	- The user enters the username and password on the login form - The user clicks the login button on the system - User is successful*login*
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	*Username* and*password* must be right
Constraint	There isn't any

2. Following are the specifications of the news use case diagram for village government actors:

Table 2. News use case specifications for village government actors

Information	Explanation
Actor	Village Administration
Use Case	News
Description	Users create posts for news
Pre Condition	Displays a page for news posts
Post Condition	News published successfully
Basic Flow	- The user is logged on to the system - The user clicks the post menu - User clicks button*Add New* on the system - The user writes the post - The user selects a post category - User chooses*Featured Image* - The user clicks the publish button - News published
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	There isn't any
Constraint	There isn't any

3. Following are the specifications of the news use case diagram for community actors:

Table 3. News use case specifications for community actors

Information	Explanation
Actor	Public
Use Case	News
Description	People read news posts
Pre Condition	Show news page

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Post Condition	People read news posts
Basic Flow	- The community enters the news page - People click on the news they want to read - The news was successfully read by the public
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	- The news must have been posted by the village government admin
Constraint	There isn't any

4. Following are the specifications of the user case announcement diagram for village government actors:

Table 4. Announcement use case specifications for village government actors

Information	Explanation
Actor	Village Administration
Use Case	Announcement
Description	Users make announcements
Pre Condition	Displays the page for posting announcements
Post Condition	News published successfully
Basic Flow	- The user is logged on to the system - The user clicks the post menu - User clicks button*Add New* on the system - The user writes the post - The user selects an announcement category - User chooses*Featured Image* - User clicks button*publish* - News published
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	There isn't any
Constraint	There isn't any

5. Announcement usecase specifications for community actors

Table 5. Announcement use case specifications for community actors

Information	Explanation
Actor	Public
Use Case	News
Description	People read announcements
Pre Condition	Displays the announcement page
Post Condition	People read announcements
Basic Flow	- People enter the announcement page - People click on the announcement they want to read - The announcement was successfully read by the public
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	- The announcement must have been posted by the village government admin

Constraint	There isn't any

6. Reporting usecase specifications for community actors

Table 4.6 **Reporting usecse specifications**

Information	Explanation
Actor	Public
Use Case	Reporting
Description	The community makes a report to the village government
Pre Condition	Displays the reporting login page
Post Condition	People make reports
Basic Flow	- People go to the reporting page - People login to make a report - More common form pelaporan - Communities submit reports - The community managed to make a report
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	- People must already have an account
Constraint	There isn't any

7. Discussion forum usecase specifications

Table 7. Discussion forum usecase specifications

Information	Explanation
Actor	Village & Community Governance
Use Case	discussion forum
Description	Users do online meet on the system
Pre Condition	Displays the start page of the discussion forum
Post Condition	Users have discussions
Basic Flow	- The user enters the discussion forum page - User clicks button*Join Meeting* - The user successfully held a meeting
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	There isn't any
Constraint	There isn't any

8. MSME Usecase Specifications

Table 8. umkm user specifications

Information	Explanation
Actor	Village & Community Governance
Use Case	MSMEs
Description	Users get information on umkm in coastal villages
Pre Condition	Displays the home page umkm
Post Condition	User managed to get information umkm
Basic Flow	- The user enters the umkm page - The user sees the initial display of the umkm page - The user clicks on the card for one of the umkm products - Users get information related to umkm products - Users contact the wa number listed to order the product

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Information	Explanation
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	-
Constraint	There isn't any

9. Religious usecase specifications

Table 9 usecase specification of religion

Information	Explanation
Actor	Village & Community Governance
Use Case	Religion
Description	Users get information and can take part in religious activities in coastal villages
Pre Condition	Shows the start page of religion
Post Condition	The user managed to get information on the religious activities of the coastal village
Basic Flow	- The user enters the religious page - The user sees the initial appearance of the religion page - Users get information on religious activities and religious news - Users click the religious activity card to see more details
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	-
Constraint	There isn't any

10. Course use case specifications

Table 10. Course use case specifications

Information	Explanation
Actor	Village & Community Governance
Use Case	Course
Description	Users perform training on the system
Pre Condition	Displays the start page of the course
Post Condition	The user has successfully completed the course
Basic Flow	- User enters the course page - The user clicks the course card that will be carried out - User clicks button*start course* - Users do the course - User completes the course
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	- Users must already have a course account
Constraint	There isn't any

11. Use case specification culture

Table 11. Usecase specification of tourism and culture

Information	Explanation
Actor	Village & Community Governance

Use Case	Culture tour
Description	Users get information about tourism and culture in coastal villages
Pre Condition	Displays the start page of tourism and culture
Post Condition	Users managed to get information about tourism and culture of coastal villages
Basic Flow	- The user enters the travel and culture page - The user sees the initial appearance of the tourism and culture page - Users get information about tourism and culture of coastal villages - Users click on news cards about tourism and culture to view and read news
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	-
Constraint	There isn't any

12. Contact usecase specifications

Table 12 Contact usecase specifications

Information	Explanation
Actor	Public
Use Case	Contact
Description	Communities get village government contact information
Pre Condition	Displays the contact page
Post Condition	User managed to get contact of village government
Basic Flow	- The user enters contacts - Users get contact information
Alternate Flow	There isn't any
Exception Flow	There isn't any
Rule	
Constraint	There isn't any

Activity Diagram

Activity diagrams describe the workflow or activities of a system or business process or menu in the software [14]. Activity Diagram has components with certain shapes connected by arrows. The arrows point to the sequence of activities that occur from start to finish. Following*Activity Diagram* in making this KMS:

1. *Activity Diagram* Home page

Activity Diagram homepage is an activity to view the start page of the application.

2. Activity Diagram News

Activity diagram news is an activity to view the list of news published by the village government

3. *Activity Diagram* News Details

Activity Diagram This news detail is an activity for reading news published by the village government.

4. Announcement Activity Diagram

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The announcement activity diagram is an activity to view the list of announcements posted by the village government.

5. *Activity Diagram* Announcement Details

The announcement detail activity diagram is an activity for viewing detailed announcements posted by the village government.

6. *Activity Diagram* discussion forum

The discussion forum activity diagram is an activity for conducting online meet discussions.

7. *Activity Diagram* Reporting

Activity diagram reporting is an activity to report an incident or event in a coastal village.

8. Activity Diagram Kursus

Course activity diagrams are activities for conducting courses or training.

9. *Activity Diagram* Contact

The contact activity diagram is an activity to get village government contact information.

d. Prototype Sistem

Prototype is a model or simulation of all aspects of the actual product to be developed, this model must be representative of the final product. In system development, situations often occur where system users have actually defined the general or software objectives even though they have not defined in detail the input, process and output [15]. Here's the prototype on the system:

1. Home view

The homepage display is in the image below:

Figure 3. Home view

2. News Prototype Display

The news display is in the following image:

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Figure 4. Display News

3. Announcement Display
   The announcement display is in the following image:

Figure 5. Display Announcement

4. Reporting View

The report display is in the following image:

Figure 6. Display Submit Reporting

5. Discussion Forum view
   The Discussion Forum display can be seen in the following image:
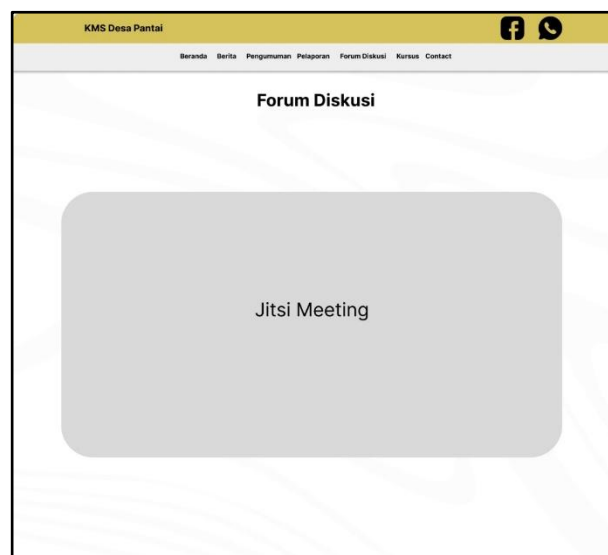
Figure 7. Views of the Discussion Forum

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6. MSME view

The umkm display is to display umkm in coastal villages. The following is the appearance of SMEs:
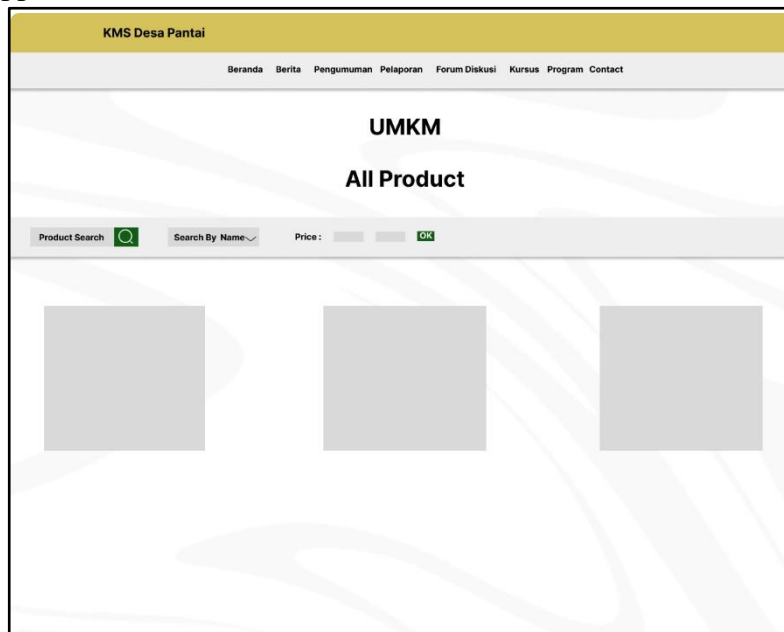
Figure 8. Display of UMKM

7. Religious Display

Religious display is information on religious activities in the coastal village for the people of the coastal village or even for people outside the coastal village. Here's a religious display:
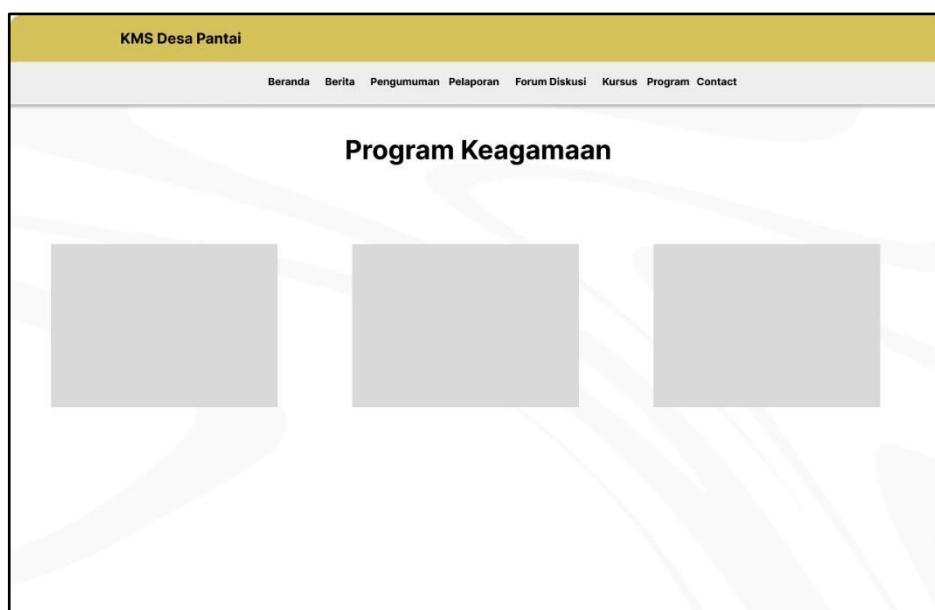
Figure 9. Display of Religious Programs

8. Course View

   The course display is in the following image:
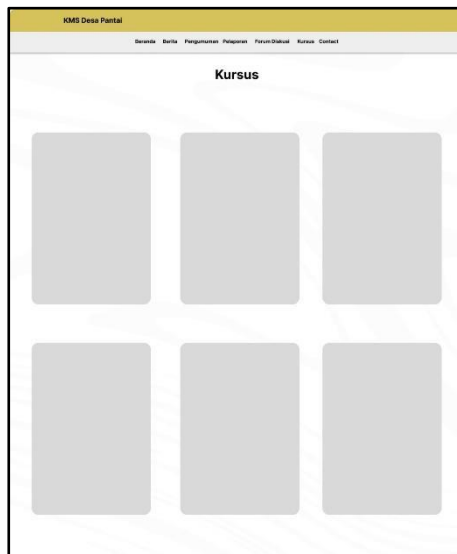
Figure 10. Course Display

9. Tourism and Culture Display

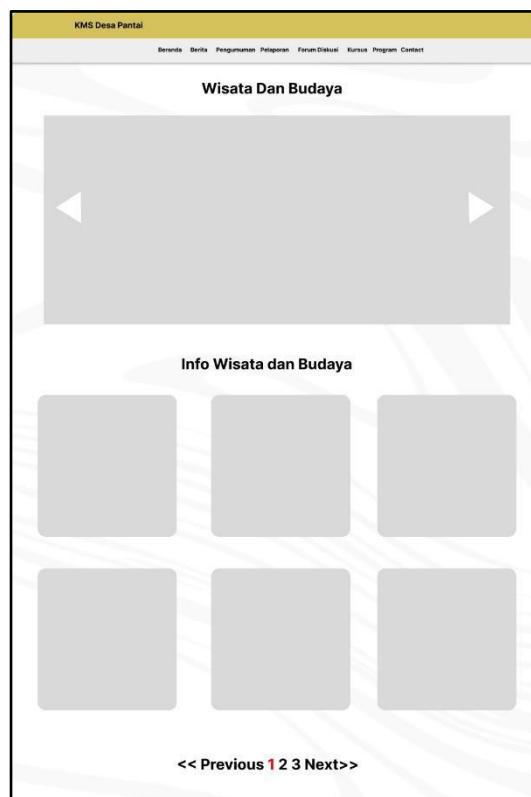   Prototype tourism and culture can be found in the following image:

Figure 11. tourism and culture prototype

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10. Contact View

The contact display is shown in the following figure:
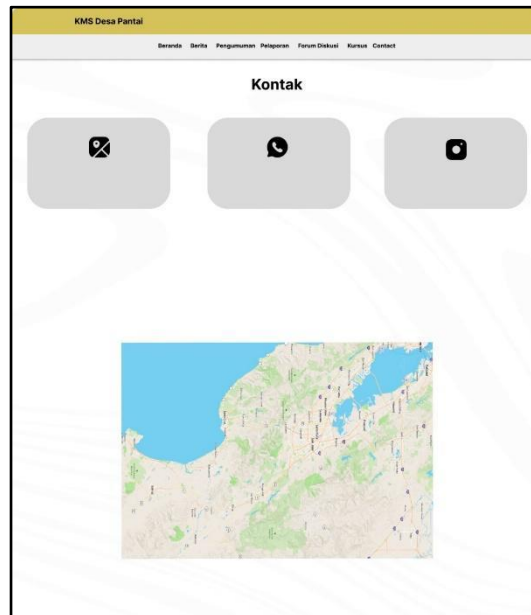
Figure 12. Display of Contacts

11. Footer View

The footer display is shown in the following image:

Figure 13. Footer View

3. *Fase Construction*

The implementation stage is the stage where the system will be built based on the analysis and design that has been made.

a. Implementation Environment

For the implementation of system development, implementation support devices are needed. The supporting devices for making the system are as follows:

1. Hardware

Computer with the following specifications:

Device Brand	Asus Vivobook

Processor	AMD Ryzen 7 3700U with Radeon Vega Mobile Gfx 2.30 GHz
Ram	12 GB
SSD	128 GB

2. Software

Operating system	Windows 11
Development Platform	Wordpress
Prototyping design	Figma
Plugins used	- LMS - Elementor - Webinar and Video Conference with Jitsi Meet - MasterStudy LMS WordPress Plugin – for Online Courses and Education - Awesome Support

3. Hosting

Hosting Provider	Idcloudhost
Domain	Kms.tipsngoding.com
Disk Space	3 GB
CPU	1 Core
RAM	1 GB

b. Implementation Results

The result of the implementation is a KMS system that is made in accordance with the analysis and design that has been done before. Following are the results of KMS implementation:

1. Home view

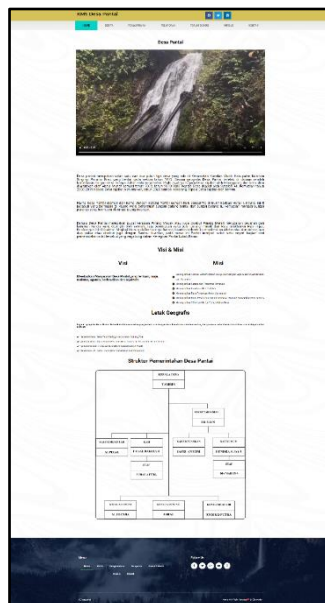The implementation of the homepage can be seen in the following image:

Figure 14. Home View Implementation

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2. News view

   The news display is shown in the following image:

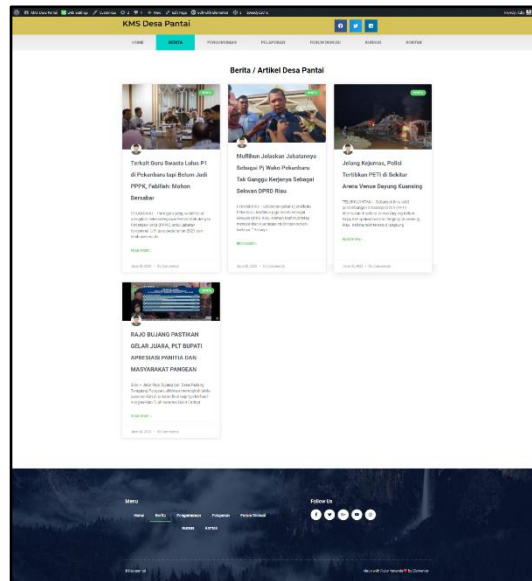**Figure 15. Display News**

3. News Detail View

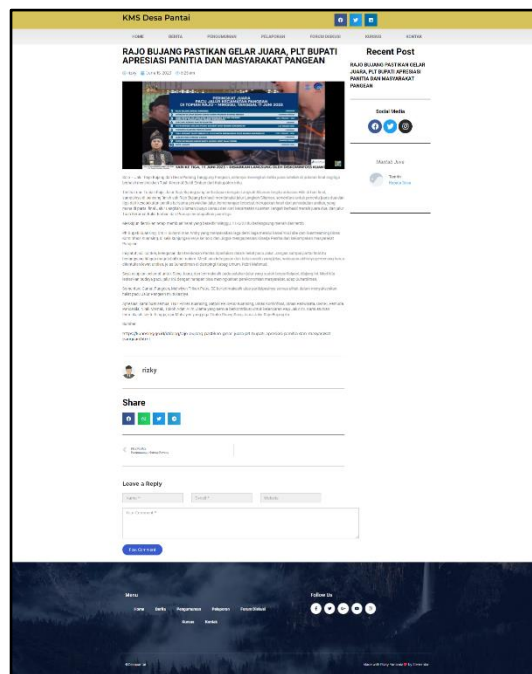   The detailed news display is shown in the following image:

Figure 16. News Detail Display

4. Announcement Display
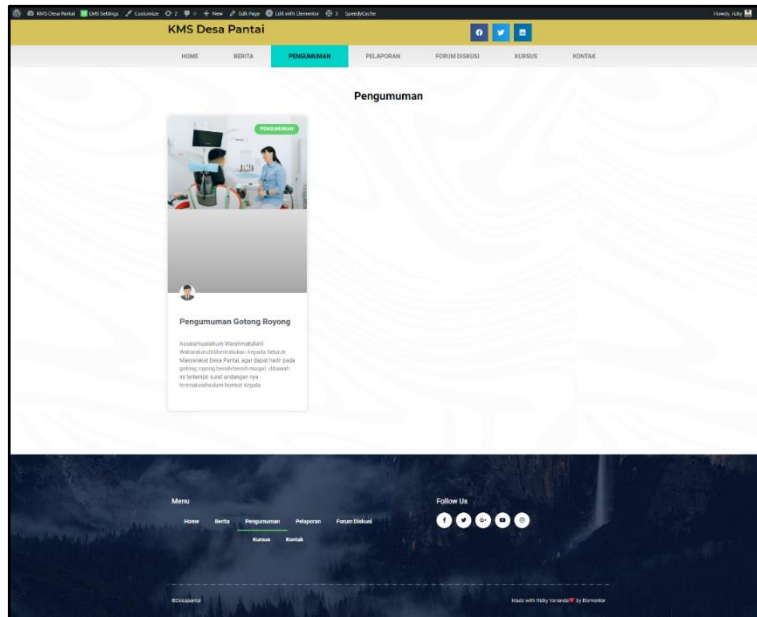   The announcement display is in the following image:

Figure 17. Display Announcement List

5. Announcement Details View
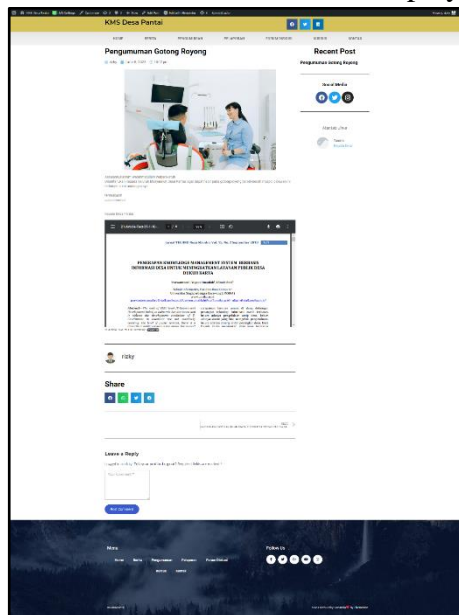   The detailed announcement display is shown in the following figure:

Figure 18. Display Announcement Details

6. Reporting View
   The reporting display is in the following figure:

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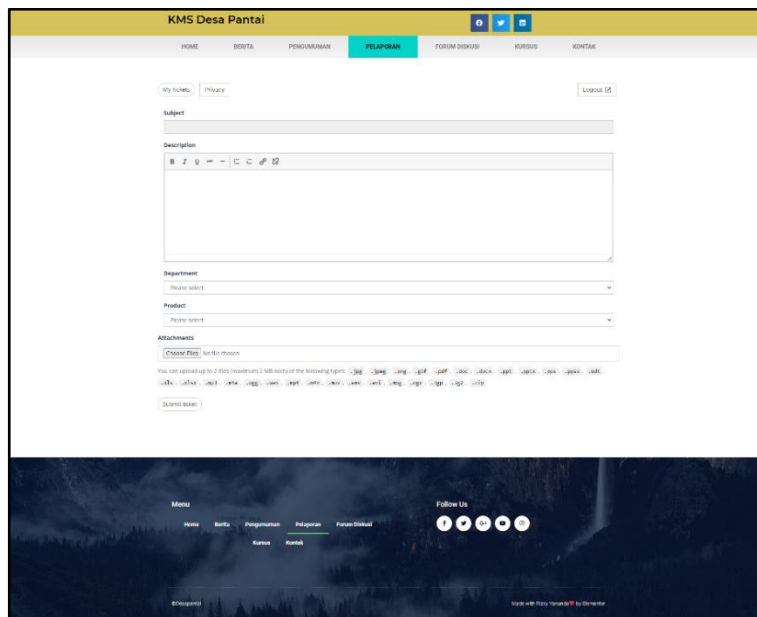
Figure 19. Reporting View

7. Discussion Forum view

   The discussion forum display is shown in the following figure:
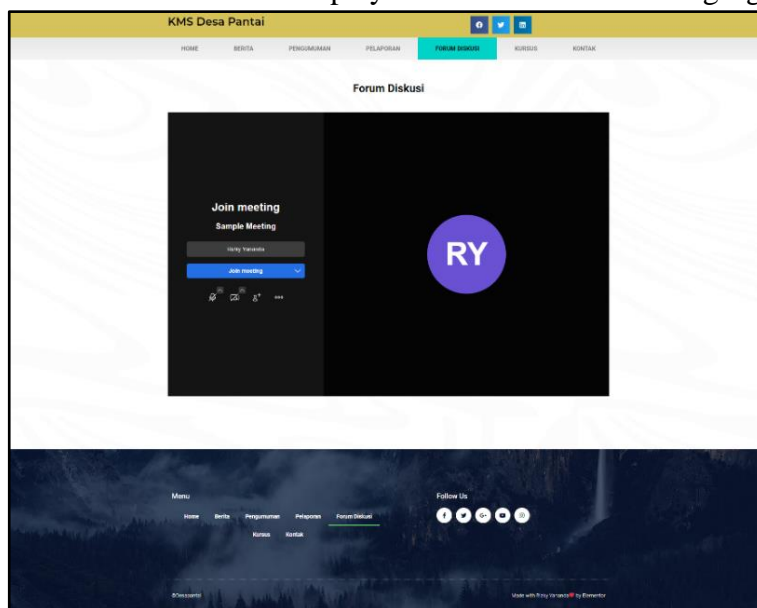

Figure 20. Display Discussion Forum

8. MSME view

   The SMEs display is to display SMEs in coastal villages. The following is the appearance of SMEs:
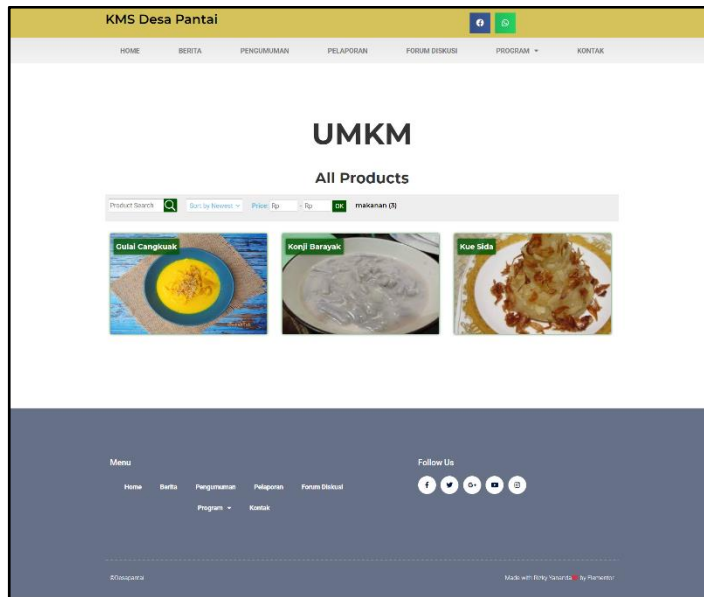
Figure 21. Display of SMEs

9. Religious Display

The religious display is information on religious activities in the coastal village for the people of the coastal village or even for people outside the coastal village. Here's a religious display:
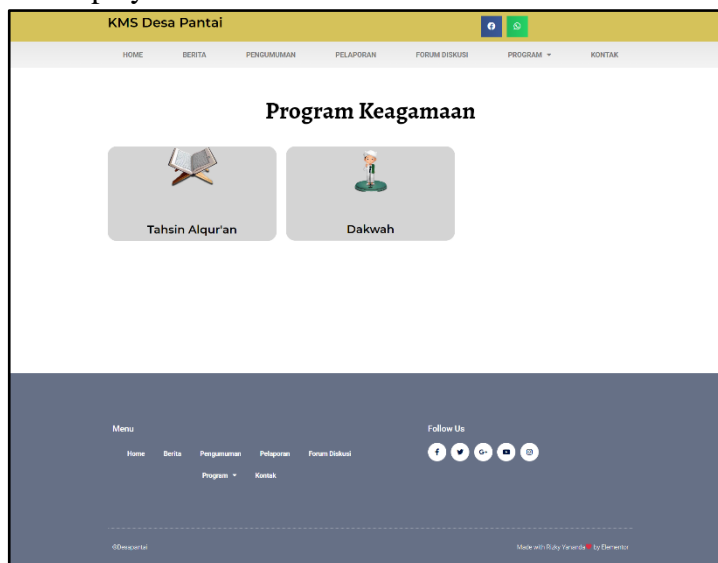
Figure 22. Display of Religious Programs

10. Course view

The course display is in the following image:

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Figure 23. Course Display

11. Tourism and Culture

Tourism and cultural displays are information about culture and tourism in the coastal village. The following displays tourist and cultural information

Figure 24. Tourism and Culture

12. Contact View

The contact display is shown in the following figure:

Figure 25. Contact View

4. Phase*Transition*

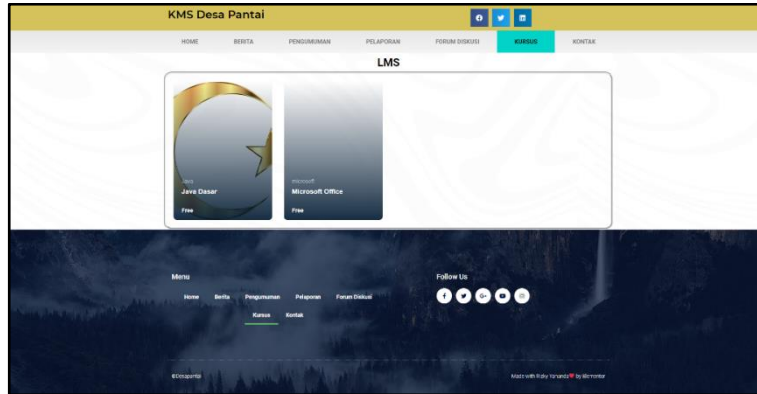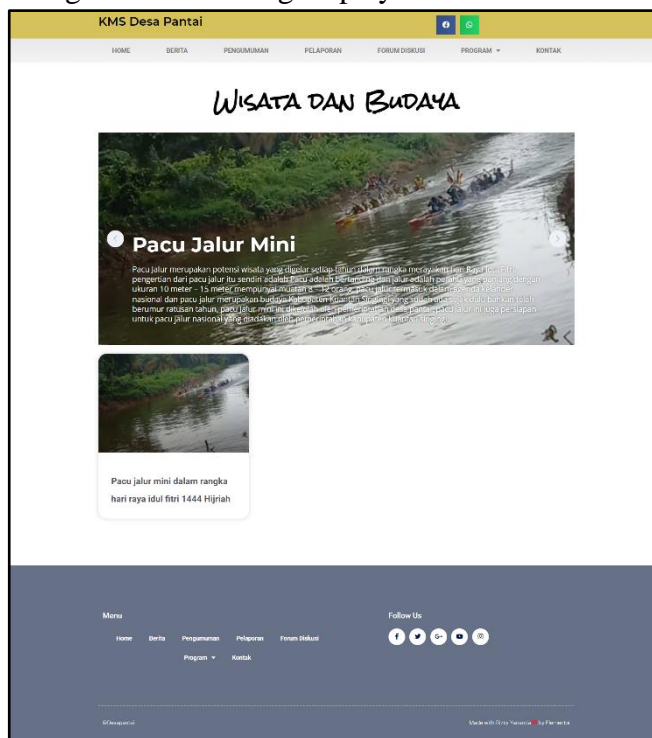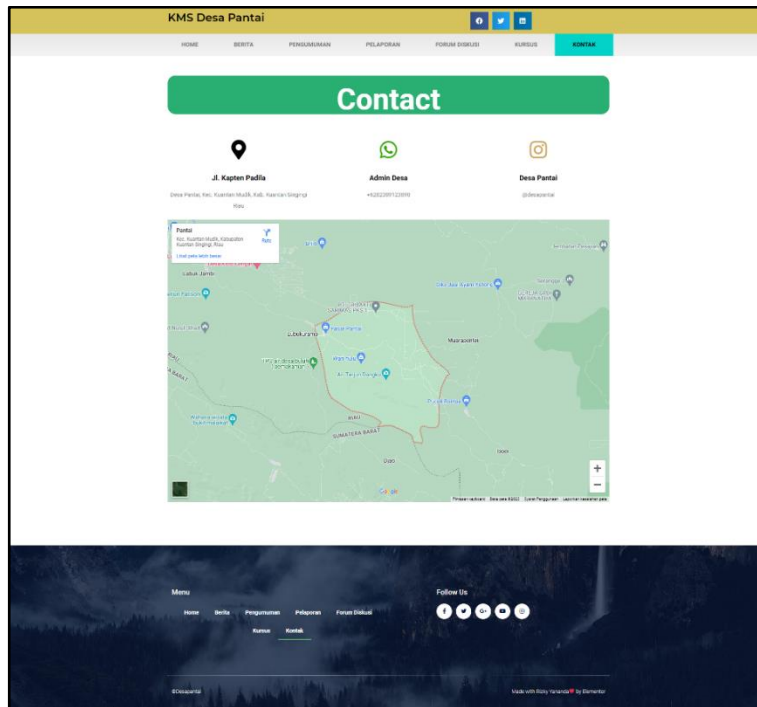Stages*transition* is the testing phase for the system being built. Application testing is carried out so that the final results of the system are as desired. testing is done is testing*User Acceptance Test* (UAT). The following is a test on the system that was built.

1. User Acceptance Test

This test is used to assess the system related to system appearance, system benefits and system feasibility. This test uses a questionnaire to get the results. For the table of respondents can be seen in Appendix B.

Questionnaires that have been answered by respondents, will later be calculated using the Likert Scale method. The Likert scale is used to measure the perceptions, attitudes or opinions of a person or group regarding social events or phenomena, based on operational definitions set by the researcher. In using the Likert scale, there are two forms of questions, namely positive questions to measure positive scales, and negative questions to measure negative scales. Positive questions are scored 5, 4, 3, 2, and 1; while negative questions were given a score of 1, 2, 3, 4, and 5.

Rumus: T x Pn

T   : Total number of respondents who voted

Pn   : Choice of Likert score numbers

In answering the questionnaire with calculations using a Likert scale, respondents answered on the Google form by selecting one*radio button* on every question. Questionnaires that have been filled in by respondents are given a score for each answer as shown in the table below:

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Table 13 Rating Weight

Statement	Score
Strongly agree	5
Agree	4
Disagree	3
Don't agree	2
Strongly Disagree	1

The results of the User Acceptance Test can be seen in the following table:

No	Questions	Strongly Agree	Agree	Less Agree	Disagree	Strongly Disagree
1	The extent to which this system meets the needs of society?					
2	Are all the features and functions expected of this system useful for the community?					
3	Is the appearance of this system easy to use by the public?					
4	Can the existence of this system help the community in receiving public services and information?					
5	Does the system provide mechanisms for community participation such as feedback, submission of suggestions, or discussion forums?					
6	Is this system accessible at any time, or is there a certain time limit?					
	Total	**45**	**46**	**5**	**0**	**0**

Based on the results of the calculation above, it can be concluded as follows:
1. P strongly agree $= 45 * 5$ $= 225$
2. P agree $= 46 * 4$ $= 184$
3. P less agree $= 5 * 3$ $= 15$
4. P disagree $= 0 * 2$ $= 0$
5. P strongly disagree $= 0 * 1$ $= 0$

Total Score $= $ **424**

After that, a search was carried out for the interpretation results by giving the highest score (X) and the lowest score (Y) with the formula, as follows.

X = Lowest score likert * Number of respondents * Lots of questions

X = 1 * 15 * 6 = 90

Y = Highest score likert * Number of respondents * Lots of questions

Y = 5 * 15 * 6 = 450

After determining the highest and lowest values, then a search is carried out to find out the interval and percent interpretation by the method of finding the percent (I) score interval, with the following formula.

I = 100 / Number of scores likert

I = 100 / 5

= 20

So the interval of the distance from lowest to highest, which is 20.

Here are the criteria for interpretation of scores based on intervals.

a.   Angka 0% - 19,99   = Strongly Disagree

b.   Angka 20% - 39,99%   = Disagree

c.   Angka 40% - 59,99%   = Sufficient

d.   Angka 60% - 79,99%   = Agree

e.   Angka 80% - 100%   = Strongly agree

After that, a search was carried out using the index formula, as follows.

Index % = Total Score / Y * 100

Index results % for respondents as follows.

Index %   = 424 / 450 * 100

= 94.2%

Conclusion

Based on the results of the research that has been done, the conclusions that can be obtained are as follows: a. This research was conducted by analyzing a *Knowledge Management System* (KMS) implemented in coastal villages as public services and information. b. The result of this research is a KMS to support public services and information in coastal villages. c. The benefit of this research is to make it easier for village administration and the community to give and receive public services and information. d. By implementing KMS, the people of Pantai Village will have easier and faster access to public information. They can access information through online portals or mobile applications which make it easier for them to obtain various information related to their village. e. With the existing KMS, the people of Pantai Village can be actively involved in managing and updating information. They have the opportunity to provide up-to-date information that can be entered into the system. This will increase community participation in managing public information and strengthen the relationship between the village government and its residents.

The suggestions given for further research development are as follows: a. For further research it is hoped that integration with the sub-district or district system. b. It is hoped that there will be an increase in features related to the development of the potential of the Beach Village community. Provide training and education to village officials and the community regarding the use of KMS. Within the framework of this training, convey information about the benefits provided by KMS, methods of accessing information, and how to be involved in managing and updating information. Encourage active participation of all individuals involved in the process.

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