# Development of Knowledge Management System for the Women Farmers Group "Migunani"

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## ABSTRACT

The development of a Knowledge Management System (KMS) for the Women Farmers Group (*Kelompok Wanita Tani - KWT*) "Migunani" represents a pivotal initiative in enhancing knowledge sharing and collaboration within the group. This KMS aims to address various challenges faced by the group, including diverse knowledge and skill levels in agriculture, limited proficiency in information technology, and the need for more effective knowledge documentation. Through the implementation of digital content for agricultural practices, training on document management using Google Cloud applications, and guidance on utilizing KMS applications, this project seeks to empower "Migunani" members with improved agricultural knowledge, technology utilization, and knowledge management capabilities. The KMS is poised to create a more efficient and effective platform for communication and knowledge sharing, ultimately contributing to the group's growth and development in the field of agriculture.

*Keywords: Knowledge Management System, Women Farmers Group, Agricultural Knowledge Sharing*

## 1. INTRODUCTION

In the context of business and information technology, a Knowledge Management System (KMS) is a system or platform designed to manage, store, and share knowledge and information within an organization or community. KMS helps organizations collect, store, organize, and distribute knowledge, both formal and informal, so it can be accessed and utilized more effectively[1].

KMS typically includes various features such as a knowledge database, search tools, collaboration, document management, and data analysis to assist users in finding, sharing, and managing knowledge. Its goal is to enhance organizational performance, innovation, and decision-making by enabling easier access to existing knowledge[2].

The implementation of KMS can vary widely, from using document management systems to more complex collaborative platforms. The primary aim of KMS is to facilitate effective knowledge management within an organization, thus improving operational efficiency and the organization's ability to adapt to changes[3].

The Women Farmers Group (*Kelompok Wanita Tani - KWT*) "Migunani" is an organization operating in the field of agriculture, primarily focusing on vegetable commodities. It is located in Sonosewu Hamlet, Ngestiharjo Village, Kasihan Subdistrict, Bantul Regency, Yogyakarta. KWT "Migunani" was established on March 16, 2021, and consists of 22 members with diverse backgrounds in knowledge, experience, and skills in agriculture.

The Women Farmers Group (KWT) Migunani faces various challenges in carrying out its activities. One of the main challenges is the diversity of knowledge, experience, and skills possessed by its members in the field of agriculture. Members of KWT Migunani come from diverse backgrounds, and this can be a constraint in coordinating agricultural activities and sharing knowledge effectively. Furthermore, limitations in the utilization of information technology are also a challenge faced by the group. Members of KWT Migunani may have constraints in accessing and using digital technology, which can affect their ability to access information and collaborate online. Inadequate knowledge documentation is also an issue, as it can hinder learning and effective knowledge exchange within the group. Efforts to address these challenges through the

development of a Knowledge Management System (KMS) are expected to help improve access to information, document knowledge, and enhance collaboration among KWT Migunani members.

The research aims to develop a specialized Knowledge Management System (KMS) for the Women Farmers Group (KWT) Migunani. It intends to improve knowledge sharing, facilitate access to agricultural information, and enhance knowledge documentation within the group. Additionally, the research strives to enhance agricultural knowledge, promote technology adoption, and encourage collaboration among KWT Migunani members. Ultimately, it seeks to improve their overall well-being and agricultural practices.

Several related studies to this research are as follows:

1. **A Review of Chatbot development for Dynamic Web-based Knowledge Management System (KMS) in Small Scale Agriculture**: This study conducts a review of Chatbot development within a dynamic web-based knowledge management system (KMS) in the small-scale agriculture sector in Malaysia. The research identifies challenges in communication among small-scale farmers and issues related to the lack of Standard Operating Procedures (SOP) in this agricultural sector[4].

2. **Knowledge internalization in e-learning management system**: This research aims to investigate the process of knowledge internalization within the e-learning management system (eLMS). It focuses on an individual's ability to connect and apply their knowledge in real-world contexts, particularly in the context of online learning. The study seeks to understand how the process of knowledge internalization plays a role in enhancing students' understanding and skills within the eLMS environment[5].

3. **Information System Development Based on Knowledge Management in Higher Education Institution**: This study aims to explore the development of an information system based on knowledge management within a higher education institution. The research adopts a qualitative approach to investigate the process. The case study method is employed to delve into the experiences, ideas, needs, and utilization of information technology for the enhancement of management information systems in this context[6].

The research "Development of Knowledge Management System for the Women Farmers Group 'Migunani'" significantly differs from the previous studies in its highly specific focus on the 'Migunani' women farmers group, aiming to develop a knowledge management system tailored to meet their unique needs and challenges in agriculture. Meanwhile, the earlier research encompassed broader topics such as the use of Chatbots in small-scale farming, the process of knowledge

internalization in e-learning, or the development of knowledge-based information systems for higher education institutions, without targeting a particular women farmers group.

## 2. METHODS

UML (Unified Modeling Language) is a standardized language used in the world of software engineering to design, model, and document software systems. UML is a visual language that employs various types of diagrams and notations to depict various aspects of software systems, including their structure, behavior, interactions, and components [7]. The primary purpose of UML is to facilitate communication among stakeholders involved in software development, such as developers, designers, project managers, and end-users. By using UML, they can have a better understanding of the system's design and functionality visually.

The stages of system development using the UML (Unified Modeling Language) approach involve a serThe stages in system development using the UML approach include [8]:

1. **Planning and Requirements Analysis**: This stage involves project planning and system requirements analysis. The project team identifies the goals, scope, and system requirements. It also includes interaction with stakeholders to understand and document detailed system requirements.
2. **Design**: After identifying the system requirements, the design stage involves creating conceptual and detailed models using UML. These models, such as use case diagrams, class diagrams, and sequence diagrams, are used to design the system's structure and workflow.
3. **Implementation**: Implementation is the stage where the actual system code is built based on the designed specifications. Developers write code, integrate components, and implement the planned solutions.
4. **Testing**: The testing stage involves testing the system to ensure that all features and functions work correctly. It includes unit testing, integration testing, and overall system testing.
5. **Documentation**: During this stage, comprehensive system documentation is prepared. This includes technical documentation that explains the system's structure and workings, as well as user manuals to assist users in using the system.
6. **Training**: Training is provided for end-users or KWT Migunani members. The goal is to ensure that they have a sufficient understanding of the system and can use it effectively.
7. **Evaluation**: The evaluation stage involves testing and retesting the system after training and deployment. This evaluation aims to ensure that the system operates as expected and meets user needs.

Each of these stages is a crucial part of a comprehensive system development cycle. Implementing the UML

approach helps in designing, developing, and managing the system in a structured manner, enabling clear modeling and accurate documentation throughout these stages.ies of steps outlined as follows:

## 2.1 Use Case Diagram

A Use Case Diagram is a type of diagram in the Unified Modeling Language (UML) used to illustrate interactions between external actors (typically users or other systems) and the software system being developed. A Use Case Diagram provides a visual representation of how users or external actors interact with the system to achieve specific goals.
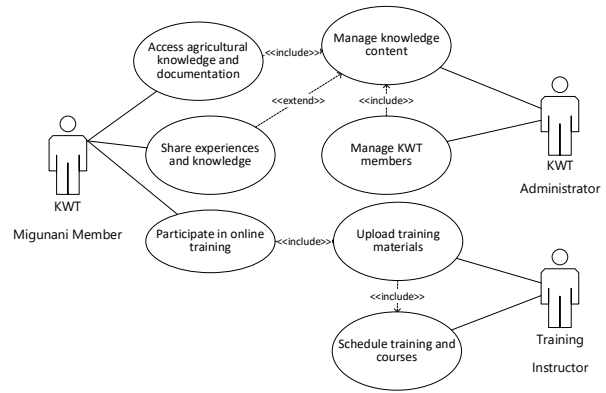


**Figure 2** Use Case Diagram.

This table covers the primary user roles in the KWT Migunani Knowledge Management System (KMS) and the features they access in the system in a simplified manner.

**Table 1** Primary User Roles.

| User | KWT Migunani KMS Features |
|---|---|
| KWT Migunani Member | • Access agricultural knowledge and documentation |
| | • Share experiences and knowledge |
| | • Participate in online training |
| KWT Administrator | • Manage knowledge content |
| | • Manage KWT members |
| Training Instructor | • Upload training materials |
| | • Schedule training and courses |

## 2.2 Actifity Diagram

Activity Diagram (Activity Diagram) is a type of diagram in the Unified Modeling Language (UML) used to depict the workflow or process within a system or activity involving various actions, decisions, and data flow[9]. Activity Diagrams are typically used to model actions and activities that occur sequentially or in parallel within a process[10].
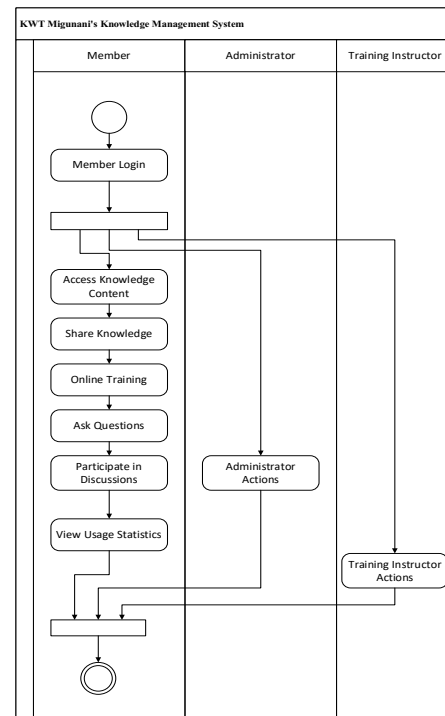


**Figure 2** Actifity Diagram.

Here is a brief explanation of the Activity Diagram for KWT Migunani's Knowledge Management System (KMS):

1. **Start**: The diagram begins with a starting point that indicates the initiation of the workflow.
2. **Member Login**: KWT Migunani members start by logging into the KMS system using their credentials.
3. **Access Knowledge Content**: After successfully logging in, KWT members can access knowledge content related to agriculture, such as articles, guides, and tutorials.
4. **Share Knowledge**: KWT members have the option to share their knowledge and experiences with other members through posts or content contributions.
5. **Online Training**: Members can choose to participate in online training to enhance their agricultural skills.
6. **Ask Questions**: Members can also ask questions to fellow members or training instructors if they have inquiries or need assistance.
7. **Participate in Discussions**: Members can join discussion forums to engage in discussions on agricultural topics and share their insights.
8. **View Usage Statistics**: Members can view KMS usage statistics to assess how often content is visited and utilized.
9. **Administrator Actions:** KWT Migunani administrators have additional access to manage knowledge content, oversee KWT members, and perform system maintenance.
10. **Training Instructor Actions**: Training instructors can upload training materials, schedule training sessions, and monitor the progress of training participants.
11. **End**: The diagram concludes with an endpoint, indicating the completion of the workflow.

This Activity Diagram provides a visual overview of the workflow within the Knowledge Management System (KMS) of KWT Migunani. It encompasses activities that can be performed by members, administrators, and training instructors within the system.

## 2.3 Class Diagram

A Class Diagram is a type of diagram in the Unified Modeling Language (UML) used to depict the static structure of a software system[11]. Class Diagrams are used to identify classes (objects) in the system, the attributes owned by those classes, and the relationships between those classes [12].
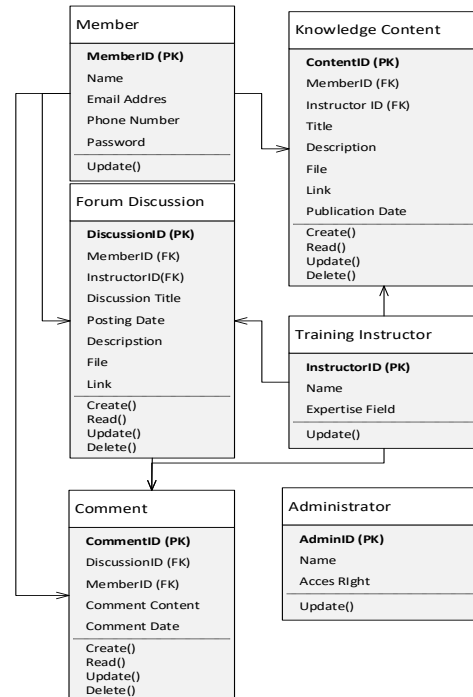


**Figure 3** Class Diagram.

In a more detailed Class Diagram of KMS KWT Migunani, we can include the concepts of primary keys (PK) and foreign keys (FK) to depict the relationships between entities more clearly.

**Table 2** Structure of Class.

| Class | Attributes | | Index |
|---|---|---|---|
| Member | - **MemberID** | Int | PK |
| | - Name | Varchar | |
| | - Email Address | Varchar | |
| | - Phone Number | Varchar | |
| | - Password | Varchar | |
| Administrator | - **AdminID** | Int | PK |
| | - Name | Varchar | |
| | - Access Rights | Enum | |
| Knowledge Content | - **ContentID** | Int | PK |
| | - MemberID | Int | FK |
| | - InstructorID | Int | FK |
| | - Title | Varchar | |
| | - Description | Text | |
| | - File | File Link | |
| | - Link | URL | |
| | - Publication Date | Date | |
| | - **InstructorID** | Int | PK |

| Class | Attributes | | Index |
|---|---|---|---|
| Training Instructor | - Name | Varchar | |
| | - Expertise Field | Enum | |
| Forum Discussion | - **DiscussionID** | Int | PK |
| | - MemberID | Int | FK |
| | - InstructorID | Int | FK |
| | - Discussion Title | Varchat | |
| | - Posting Date | Date | |
| | - Description | Text | |
| | - File | File Link | |
| | - Link | URL | |
| Comment | - **CommentID** | Int | PK |
| | - DiscussionID | Int | FK |
| | - MemberID | Int | FK |
| | - InstructorID | Int | FK |
| | - Content | Text | |
| | - Comment Date | Date | |

This table provides a more organized overview of the classes, attributes, primary keys (PK) used for unique identification, and foreign keys (FK) representing relationships in the Class Diagram of KMS KWT Migunani.

## 3. RESULTS

### 3.1 Implemetation

The implementation phase of this research involves the practical application of the proposed Knowledge Management System (KMS) within the Women Farmers Group (KWT) "Migunani." It is essential to ensure that the KMS is effectively integrated into the organization's daily operations to achieve the desired improvements in knowledge sharing, technology utilization, and documentation.



**Figure 3** User Interface Knowledge Management System

1. **System Setup and Configuration**: The first step in the implementation process is to set up and configure the KMS software. This includes installing the necessary software components, configuring user access permissions, and customizing the system to align with KWT "Migunani's" specific requirements.

2. **User Training**: To ensure a smooth transition, members of KWT "Migunani" will undergo training sessions on how to use the KMS effectively. Training will cover various aspects, including navigating the system, uploading and accessing knowledge content, participating in forum discussions, and managing their profiles.

3. **Content Migration**: Existing knowledge resources, documents, and data will be migrated into the KMS. This includes valuable information on farming techniques, crop varieties, and marketing strategies. The content will be organized and categorized for easy retrieval.

4. **Pilot Testing**: Before full-scale implementation, a pilot test phase will be conducted with a select group of KWT "Migunani" members. This phase will help identify any potential issues or areas for improvement in the system.

5. **Full Deployment**: Following successful pilot testing, the KMS will be deployed organization-wide. All members will have access to the system, and they will be encouraged to actively engage in knowledge sharing, discussions, and document management through the KMS.

6. **Monitoring and Evaluation**: Continuous monitoring and evaluation will be an integral part of the implementation process. Regular feedback will be collected from users to identify challenges and areas requiring further improvement.

7. **Technical Support**: A dedicated technical support team will be available to address any technical issues or queries that KWT "Migunani" members may encounter while using the KMS.

8. **Performance Metrics**: Key performance indicators (KPIs) will be established to assess the effectiveness of the KMS in improving knowledge sharing, technology utilization, and documentation within the organization. These metrics will help track progress and make necessary adjustments.

9. **Documentation and Reporting**: The implementation phase will be well-documented, and periodic reports will be generated to provide insights into the progress, challenges, and achievements of the KMS implementation.

10. **Sustainability Planning**: Plans for the long-term sustainability of the KMS will be developed to ensure its continued usefulness and relevance in supporting KWT "Migunani's" agricultural activities.

The successful implementation of the KMS is a crucial step toward enhancing knowledge management practices within KWT "Migunani" and ultimately improving their agricultural endeavors. It is essential to foster a culture of knowledge sharing and collaboration among members to maximize the benefits of the KMS.

## 3.2 Testing

### 3.2.1   Black Box Testing

Black Box Testing is a software testing method that focuses on testing the functionality of software without considering the internal code structure or implementation[13]. In this testing, the testing is done from the perspective of users or external stakeholders who do not have knowledge of how the software is built internally. Here is the Black Box Testing instrument for the KMS KWT Migunani application in tabular format:

**Table 2** Black Box Testing instrument

| No | Questions | Answer Choices |
|---|---|---|
| 1 | Can you log in to the application? | Yes / No |
| 2 | Can you access your profile after logging in? | Yes / No |
| 4 | Can you create a new member profile? | Yes / No |
| 5 | Are you able to modify your profile information? | Yes / No |
| 6 | Can an administrator delete or edit existing content? | Yes / No |
| 7 | Are there different access restrictions for administrators? | Yes / No |
| 8 | Can you search for knowledge content based on keywords? | Yes / No |
| 9 | Can you read and access knowledge content? | Yes / No |
| 10 | Can a Training Instructor add or remove materials? | Yes / No |
| 11 | Can a Training Instructor monitor member progress in training? | Yes / No |
| 12 | Can you create new discussions in the forum? | Yes / No |
| 13 | Can you see the date and time of postings in discussions? | Yes / No |
| 14 | Can you provide comments on knowledge content or discussions? | Yes / No |
| 15 | Can you edit or delete your comments? | Yes / No |
| 16 | Can members participate in discussions and training? | Yes / No |

### 3.2.2   Alpha Testing

Alpha test is the first stage of testing for a software, application, or technological product before it is released to end users or the market [14]. Alpha testing is typically conducted by the development team or internal testers within the company developing the product. The purpose of alpha testing is to identify bugs, errors, and other technical issues that may exist in the software or product before it reaches the beta testing stage or before it is tested by end users[15].

Here is the Alpha Testing instrument with questions in tabular format and Likert scale answer choices:

**Table 3** Alpha Testing Instrument

| No | Question | Likert Scale (1-5) |
|---|---|---|
| 1 | How easy is it for you to navigate the application? | 1 (Very Difficult) – 5 (Very Easy) |

| No | Question | Likert Scale (1-5) |
|----|----------|--------------------|
| 2 | To what extent does the application meet your functional needs? | 1 (Does Not Meet) – 5 (Meets Very Well) |
| 3 | How responsive is the application to your actions? | 1 (Very Slow) – 5 (Very Fast) |
| 4 | What is your level of satisfaction with the visual appearance of the application? | 1 (Not Satisfied) – 5 (Very Satisfied) |
| 5 | How well do the application's features work? | 1 (Not Working Well) - 5 (Working Very Well) |
| 6 | Have you encountered any errors or bugs during usage? | 1 (Frequently) – 5 (Never) |
| 7 | How confident are you in the security of your data within the application? | 1 (Not Confident) – 5 (Very Confident) |
| 8 | To what extent do you find this application useful? | 1 (Not Useful) – 5 (Very Useful) |
| 9 | How difficult is it for you to find specific features? | 1 (Very Difficult) – 5 (Very Easy) |
| 10 | Do you have any additional suggestions or feedback? | 1 (No Feedback) – 5 (Lots of Feedback) |

In the Likert scale, 1 typically indicates a high level of dissatisfaction or disagreement, while 5 indicates a high level of satisfaction or agreement. Respondents are asked to choose a number that corresponds to their perception for each question. Here is the summary chart of the alpha test questionnaire with 25 respondents.
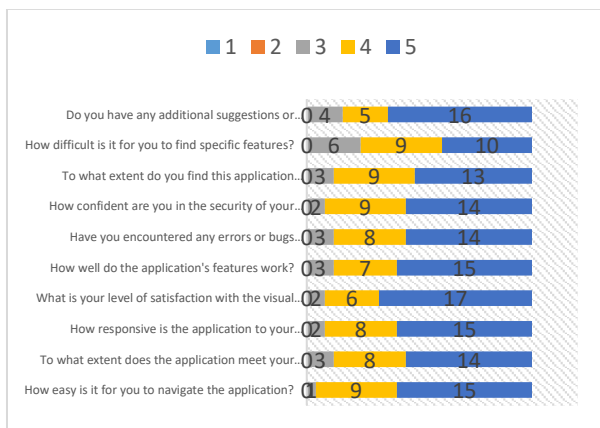


**Figure 4** Summary Chart of The Alpha Test

Based on the analysis of the Alpha Test questionnaire with the participation of 25 respondents, several conclusions can be drawn:

1. **Ease of Navigation**: Most respondents rated that the application is easy to navigate. This indicates that the application has a user-friendly interface.
2. **Functional Needs Fulfillment**: The majority of respondents feel that the application fulfills their

functional needs well. This suggests that the application's functionality aligns with user expectations.

3. **Responsiveness**: The application is rated as responsive to user actions, indicating good responsiveness.
4. **Satisfactory Visual Appearance**: Most respondents are satisfied with the visual appearance of the application. This indicates that the application has an appealing visual design.
5. **Feature Performance**: The application's features work well, suggesting that the features function as expected.
6. **Encounter of Errors or Bugs**: Most respondents did not encounter errors or bugs while using the application. This indicates that the application is relatively free of significant technical issues.
7. **Confidence in Data Security**: The majority of respondents have confidence in the security of their data within the application. This suggests that users trust the data security measures implemented in the application.
8. **Application Utility**: The application is considered useful by most respondents. This indicates that the application effectively serves its purpose.
9. **Difficulty in Finding Specific Features**: Some respondents experienced difficulty in finding specific features within the application. This suggests there is room for improvement in providing guidance or assistance for feature discovery.
10. **Suggestions and Feedback**: Several respondents provided additional suggestions and feedback, which

can serve as valuable guidance for further enhancements of the application.

Overall, the Alpha Test results suggest that the application performs well in most aspects, but there are some areas that need improvement. User feedback can guide further improvements in the development of this application.

### 3.4 Evaluation

Advantages of This Research:

1. **Identifying Existing Issues**: This research successfully identifies the problems faced by the Women Farmers Group (KWT) "Migunani" in terms of knowledge management and information technology utilization. This can assist KWT "Migunani" in overcoming these challenges.
2. **Development of Knowledge Management System (KMS)**: This research provides a solution in the form of the development of a Knowledge Management System (KMS) that can help KWT "Migunani" in managing their knowledge and information more efficiently.
3. **Optimizing Technology Utilization**: With training in content development and document management using Google Cloud applications, this research helps the members of KWT "Migunani" to better utilize information technology and multimedia.
4. **Knowledge Documentation**: This research also prioritizes knowledge documentation, which is a crucial aspect of Knowledge Management. This can help KWT "Migunani" in storing and sharing their knowledge more effectively.

Weaknesses of This Research:

1. **Limited Participation**: This research involves a small number of respondents (25 respondents) in the Alpha Test. This number may be limited in representing all potential users of the application.
2. **Limited Resources**: This research may face resource constraints, especially in the development of a comprehensive KMS. Additional resources may be needed to implement the solution effectively.
3. **Limited Feedback**: Resource and time constraints may limit the quality and quantity of feedback obtained from respondents. More in-depth and extensive feedback may be required for better improvements.
4. **Time Constraints**: This research may be constrained by time limitations in implementing the solution and collecting feedback. The implemented solution may require additional time for testing and refinement.

5. **Limited Technical Resources**: Members of KWT "Migunani" may require additional training in using KMS and related technology.

Despite these weaknesses, the steps taken to address Knowledge Management challenges in KWT "Migunani" can provide tangible benefits if managed properly.

## 4. CONCLUSIONS

This research has focused on addressing the Knowledge Management and technology utilization challenges faced by the Women Farmers Group (KWT) "Migunani" in their agricultural activities. The study identified various issues related to knowledge sharing, technology utilization, and documentation within the organization. To address these challenges, the research proposed the development of a Knowledge Management System (KMS) tailored to the needs of KWT "Migunani."

The advantages of this research include its ability to identify and address existing problems, provide a solution in the form of a KMS, optimize technology utilization, and emphasize knowledge documentation. These advantages can contribute to improving the efficiency and effectiveness of knowledge sharing and management within the organization.

However, the research also has its limitations, including the involvement of a limited number of respondents, resource constraints, limited feedback, time constraints, and the potential need for additional technical training for KWT "Migunani" members.

In conclusion, this research serves as a valuable initiative to enhance Knowledge Management practices within KWT "Migunani" and optimize their use of information technology. By addressing these challenges and leveraging the proposed KMS, KWT "Migunani" can potentially enhance their agricultural activities, knowledge sharing, and overall productivity. Further research and development efforts are needed to refine and implement the proposed solutions effectively.

## 4. SUGGESTIONS

After undergoing the Alpha testing process and analyzing its results, this research has identified several weaknesses and challenges that need to be addressed in the development of the Knowledge Management System (KMS) for the Women Farmers Group (KWT) "Migunani." To ensure the successful implementation of the proposed KMS, here are some suggestions that need to be considered:

1. **Increase Respondents**: To enhance the validity of the Alpha testing results, it is advisable to involve

more members of KWT "Migunani" as respondents. By engaging a larger pool of potential users, the data obtained will be more representative.

2. **Resource Allocation**: Additional resources, both in terms of time and budget, should be allocated to ensure the smooth development of the KMS. Comprehensive KMS development requires adequate financial support and human resources.

3. **Enhance Feedback**: To gain more in-depth and extensive feedback, consider using more detailed research methods such as in-depth interviews or focus groups. This will help identify more specific issues and appropriate solutions.

4. **Efficient Time Management**: To address time constraints in implementing solutions, thorough planning and careful time allocation are essential. Setting priorities and realistic deadlines will help ensure successful implementation.

5. **Additional Technical Training**: Provide additional training to members of KWT "Migunani" regarding the use of the KMS and related technology. This will help them maximize the benefits of the proposed system.

## ACKNOWLEDGMENTS

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