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SMEVOLUTION: A DIGITAL KNOWLEDGE MANAGEMENT SYSTEM FOR INDONESIAN SME GROWTH

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Abstract

SME Evolution Digital Knowledge Management System (SMEvolution) is a knowledge management technology aimed at simplifying the knowledge creation process, assisting SMEs in embracing rapidly evolving digital technologies. This study aims to revitalize Indonesia's economic landscape by focusing on MSMEs and their adoption of knowledge management (KM). This research was structured by identifying various characteristics of knowledge management activities within the MSME environment. These characteristics were gleaned from a survey utilizing a 37-question questionnaire sourced from relevant library materials. Quantitative methods were employed to analyze the survey results garnered from 103 MSME respondents in Indonesia. The data analysis utilized Pearson correlation analysis, which indicated that the anticipated Knowledge Management System (KMS) is envisioned in the form of a website capable of facilitating discussion processes within it. This finding could serve as a recommendation to implement a KMS web forum discussion, which can provide numerous benefits for users, including information exchange, learning, networking, and personal as well as professional growth.

Keywords: Knowledge Management System, Knowledge Management, MSME, Pearson Correlation.

INTRODUCTION

The activities and habits formed during the pandemic period are not without consequences. Indonesia is currently facing the threat of an economic crisis due to the declining purchasing power of the population, which will impact the sustainability of Micro, Small, and Medium Enterprises (MSMEs). Referring to the results of the Paxel Buy and Send Insight II survey, there has been a decrease in the number and frequency of public shopping during and after the pandemic. The reduced purchasing power of the population has contributed to a decrease in stock for at least 39.9% of MSMEs and a reduction in employees for 16.1%.

The challenges faced by MSMEs extend beyond the decrease in the number and frequency of public shopping. There is also the proliferation of imported products on digital platforms (e-commerce and social commerce), such as TikTok Shop, which has adversely affected local MSME products. According to liputan6.com, foreign entities control 56% of Indonesia's digital economy in e-commerce and 65% in social commerce. The economic crisis within MSMEs can potentially pose a threat to Indonesia's economy, given the crucial role of MSMEs as drivers of domestic economic growth and workforce absorption.

Efforts to revive the current economic conditions necessitate mitigation and recovery solutions for the national economy. Short-term priority mitigation steps can be taken by creating demand-side stimuli and encouraging the utilization of digital platforms (online) to expand partnerships. Further

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mitigation concepts can involve collaboration in utilizing innovation and technology to support improvements in product quality, processing processes, packaging, marketing systems, and other aspects. However, the low adoption of digital technology in the MSME environment presents a challenge to mitigation and national economic recovery efforts. A survey conducted by the Ministry of Cooperatives and Small and Medium Enterprises in 2022 revealed that only 20% of Indonesian MSMEs have adopted digital technology. Additionally, 40% of MSMEs claim limited access to technology, while 30% admit to a lack of understanding of digital utilization, and another 30% cite limited resources.

Considering the current situation, these challenges should be addressed, expedited, and resolved to ensure the success of mitigation and national economic recovery solutions. Success in addressing these challenges depends heavily on the availability of knowledge. Therefore, the complexity of the encountered context and the reach of knowledge must be well understood and managed (Plessis, 2007).Technology-based Information and Communication Technology (ICT) systems can be beneficial in knowledge-based activities, but caution is needed in their usage (Walsham, 2011). Research by Tatiana Andreeva and Aino Kianto found that the utilization of ICT and human resource management within the framework of Knowledge Management (KM) practices can positively impact competitiveness and economic performance (Tatiana Andreeva, 2012). Knowledge management and decision-making strategies are known to be crucial factors for organizations (Abubakar Mohammed Abubakar, 2019). Knowledge management is believed to enhance organizational and individual awareness of sharing knowledge. KM can also sustain organizational knowledge as a competitive advantage and value to improve services. In general, KM is closely related to human participation. Therefore, every member of the organization as an intangible asset plays a role in creating KM within their organization.

This research is conducted to identify suitable technology to support knowledge management and develop the design of a knowledge management system application in the MSME environment.

LITERATURE REVIEW

Knowledge Management System (KMS)

Knowledge management is defined as a system and process aimed at managing the knowledge possessed by individuals or organizations to effectively utilize it in achieving business or organizational goals. It involves the systematic and directed collection, storage, dissemination, and utilization of knowledge within an organization. The objective is to enhance organizational performance, innovation, and learning (Sabherwal, 2004), (Dalkir K. , 2013), (Alavi, 2001).

Meanwhile, a knowledge management system (KMS) is defined as a set of information technology and processes designed to facilitate knowledge management within an organization. This system encompasses software, databases, collaboration tools, and other technological infrastructure used to effectively collect, store, access, and distribute knowledge throughout the organization (Alavi, 2001). A knowledge management system encompasses not only technology but also procedures and culture that facilitate the flow of knowledge throughout the company, enabling effective creation, storage, and exchange of knowledge (Nonaka I. T., 1995).

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MSMEs

MSMEs stands for Micro, Small, and Medium Enterprises, which refers to businesses with limited numbers of employees, revenue, or assets. MSMEs play a significant role in the economy of a country as they contribute most of the total business and create employment opportunities for society.

According to Law Number 20 of 2008 concerning Micro, Small, and Medium Enterprises, MSMEs are businesses that meet certain criteria for assets, sales turnover, or both criteria, with specific limits set by the government (Law Number 20 of 2008 concerning Micro, Small, and Medium Enterprises, 2008).

MSMEs are also defined as businesses with up to 250 employees and annual revenues up to a certain limit (Oya Pinar Ardic, 2011).

The definition of MSMEs can vary between countries, depending on the size of the market and local economic characteristics (Observer, 2000).

MSMEs are typically grouped by size, namely micro enterprises (with up to 9 employees), small enterprises (with up to 49 employees), and medium enterprises (with up to 249 employees) (McMahon, 2017).

MSMEs are also often identified as the "economic backbone" due to their contributions to economic growth, job creation, and community empowerment (Greenjobs, 2015)

Knowledge Management System in MSMEs

Similar information system development is also carried out to support the needs of MSMEs in marketing their products.

This information system is based on Android mobile which was created based on the needs of users and customers in an effort to increase the independence, efficiency and effectiveness of MSMEs.

The development of this system uses an object-oriented approach so that it can provide clear information that can be understood by stakeholders because its tasks and functions will be explained and linked to the actors in the system (Aditya, 2018).

A similar system was also developed for Furniture Micro, Small, and Medium-sized Enterprises (MSMEs) to address challenges related to product marketing through intermediaries.

The issues stem from selling products through second parties or intermediaries, leading to slim profit margins due to the inability to directly set prices for consumers. In response, a sales system for furniture MSMEs has been developed, allowing direct access by end-users. The goal is to enhance the income of furniture MSMEs, providing them with the ability to set prices directly and strengthening their value and competitiveness in the industry.

The system was developed using the Rapid Application Development (RAD) methodology, employing the PHP programming language, and utilizing a MySQL database (Rooswhan Budhi Utomo, 2018).

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Pearson Correlation Analysis

Pearson Correlation Analysis is a statistical method used to measure the strength and direction of the relationship between two continuous variables. This method produces the Pearson correlation coefficient, which is a measure of how closely two variables are linearly related. The Pearson correlation coefficient can range from -1 to 1, where a value of 1 indicates a perfect positive relationship, a value of -1 indicates a perfect negative relationship, and a value of 0 indicates no linear relationship between the two variables (Pearson, 1895), (Brian S. Everitt, 2001), (Joseph F. Hair Jr., 2006), (Field, 2009), (Tabachnick, 2013).

Unified Modeling Languange (UML)

Unified Modeling Language (UML) is a visual language used to document, design, and model object-oriented software systems.

UML provides a standardized set of graphical notations for depicting various aspects of the system, including its structure, behavior, and interactions among components (Alan Dennis B. W., 2015), (Grady Booch, 2005), (Martin Fowler, 2004).

UML diagrams are divided into two main groups, namely to model the structure of a system and to model behavior. Structure diagrams consist of class diagrams, object diagrams, package diagrams, implementation diagrams, component diagrams, component structure diagrams.

Meanwhile, behavioral diagrams consist of activity diagrams, sequence diagrams, communication diagrams, interaction overview diagrams, timing diagrams, state machine diagrams, and use case diagrams (Alan Dennis B. H., 2012).

Use case diagrams describe the main functions of the system in a simple way and the users who will interact with the system.

Use case diagrams have parts including: Actors (describe users who use the system), Use cases (describe the main function of the system), System boundaries (the scope of the system being described), Association relationships (relationships or interactions between actors and use cases) (Alan Dennis B. H., 2012).

Activity diagrams can describe processes in an information system. Activity diagrams can be used to describe workflows or business processes in a system that consists of several use cases or detailed business flows that only consist of one use case. There are several elements in activity diagrams including: Activity (describes concrete actions or steps in a process), Action Flow (arrows that connect activities and show the logical sequence or flow from one activity to the next), Decision Node (shows decision branches in the flow activity), Control Flow (describes the direction of flow from one activity to another), Fork (divide the activity flow into several branches in parallel), Join (combine several branches back into one single flow), Swimlanes (divide the activity diagram into groups or parts based on the owner or responsible entity), Object or Artifact (Representation of the object or equipment involved in a particular activity), Initial node (marks the starting point in the activity diagram) and final node (shows the end point or termination of an activity) (Alan Dennis B. H., 2012).

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RESEARCH METHODOLOGY

In preparing a research study, clear stages are necessary to ensure that the research can be accomplished according to its objectives. Therefore, the researcher outlines the research stages in Figure 1.

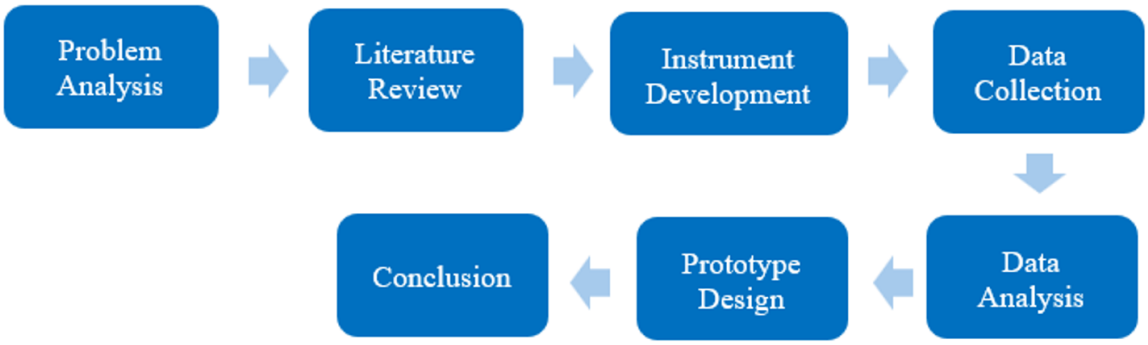

Figure 1: Research Stages

Based on Figure 1, the stages begin with the activity of analyzing the research problem. Problem analysis is a stage where the researcher identifies issues through observation and interviews with MSME actors. After identifying the encountered problems, the next step involves a literature review to obtain theoretical foundations from several previous studies in the development of knowledge management systems.

The learning outcomes lead to alternative solutions to the problems, and subsequently, the research instrument is developed in the form of a questionnaire. The indicators of the research instrument are identified based on relevant literature review results related to this research. The identification of these indicators is carried out by summarizing categories of KM processes, KM Systems, KM Sub-Processes, KM Mechanisms, and KM Technologies adopted from Becerra (Sabherwal, 2004).According to several previous studies, KM processes include knowledge discovery (KD) (Sabherwal, 2004), (J. Haack, 2009), (Alhawari, 2011) , (Pechenizkiy, 2005), knowledge capture (KC) (Sabherwal, 2004), (S. Hari, 2004), (Smith, 2000), knowledge sharing (KS) (Sabherwal, 2004), (Y. Xue, 2012), (J. Welschen, 2012), (N. M. Noor, 2011), and knowledge application (KA) (Sabherwal, 2004), (Park, 2007). All processes are integrated into KM sub-processes, KM mechanisms, and KM technologies.

KM sub-processes for each process include combination, socialization, externalization, externalization, exchange, direction, and routine (Sabherwal, 2004), (C. Curado, 2011), (H. Chitto, 2010), (Dalkir, Knowledge Management in Theory and Practice, 2005), (A. Haslinda, 2009), (Nonaka I. , 1994).

The questionnaire instrument is composed of 37 questions adopted from previous research (Elin Cahyaningsih, 2016). Each question explains the criteria for KM processes and sub-process elements such as Knowledge Discovery (KD) with 11 questions, Knowledge Capture (KC) with 9 questions, Knowledge Sharing (KS) with 8 questions, Knowledge Application (KA) with 9 questions (see Table 1).

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Table 1: Indicators of the Research Instrument

37 Research Question			
KD1	Web Based Access to Data	KC1	Lesson Learn System
KD2	Repository Information	KC2	Lesson Learn Database
KD3	Database	KC3	Best Practice Database
KD4	Best Practice Database	KC4	Best Practice System
KD5	Lesson Learn Database	KC5	Expert System
KD6	Web Portal	KC6	Daily Activity Database
KD7	Data Mining	KC7	AI Based Knowledge Acquisition
KD8	Chat Group	KC8	Computer Based Simulation Computer
KD9	Video Conference	KC9	Based Communication
KD10	Electronic Discussion Group	KA1	web portal
KD11	Email	KA2	case based reasoning
KS1	Electronic Discussion	KA3	enterprise resource planning
KS2	Teleconference	KA4	help desk system
KS3	Email	KA5	decision support system
KS4	Video Conference	KA6	expert system
KS5	Web Based Access to Data	KA7	work performance system
KS6	Expertise Locator System	KA8	physical repository of information
KS7	Repository Of Information	KA9	management information system
KS8	Team Collaboration Tools		

The response scale of the instrument utilizes the Likert Scale: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), Strongly Disagree (1).

Before the statements are distributed to the respondents, the researcher conducts a questionnaire test through the content validity process.

After content validity is conducted and yields good results, the next stage in the research is the collection of data using a quantitative instrument among MSME actors.

This activity is carried out by distributing online questionnaires. Data collection is conducted over a period of three months, resulting in a total of 103 usable respondents.

Data processing of the questionnaires is conducted by performing reliability and validity tests to assess the consistency and reliability of the measurement tool.

If the testing is completed and deemed valid, data processing proceeds by identifying priorities based on the highest values of Pearson correlation.

The analysis results are obtained to support drawing conclusions regarding the main research problems, along with recommendations for the development of features desired in the Knowledge Management System (KMS).

The available features undergo a design process utilizing UML to develop the application design of the knowledge management system in the MSME environment.

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RESULTS AND DISCUSSION

Respondents

The data for this research was obtained by utilizing an online questionnaire distributed to MSME actors. Data collection took place over a period of three months, resulting in a total of 103 respondents with respondent profiles presented in Table 2.

Table 2: Respondent Profile

Category	Variable	Frequency	Percentage
Gender	Male	35	33,98%
	Female	68	66,02%
Age	≤ 19 years	5	4,85%
	20 – 30 years	35	33,98%
	30 – 40 years	60	58,25%
	50 – 60 years	3	2,91%
	> 60 years	0	0%
Education	High School	23	22,33%
	Diploma Degree	7	6,80%
	Bachelor's Degree	68	66,02%
	Master's Degree	5	4,85%
	Doctorate/Ph.D.	0	0%
Employment Status	Owner	85	82,52%
	Full time Employee	10	9,71%
	Full time Contract Employee	5	4,85%
	Part time Empolyee	3	2,91%

Table 2 provides a detailed profile of the research respondents. The respondent classification in Table 2 shows that 66% of the respondents are predominantly female. Regarding the age segment of the respondents, it is found that the largest group falls in the age range of 30 to 40 years, constituting 58%, and 66% of the respondents have an educational background at the undergraduate level (S1). In terms of employment status, the majority of respondents (82%), are owners of MSMEs.

Results of Reliability and Validity Testing

The reliability and validity test are conducted to measure the instrument. The purpose of testing the validity and reliability of the questionnaire is to ensure that the questionnaire we have constructed is truly effective in measuring phenomena and producing valid data. Measurement in the validity test uses the Pearson Correlation value. Questions that have a significant correlation with the total score indicate that those questions can provide support in revealing what is intended to be uncovered, thus considered valid. If the calculated r ≥ the table r (two-tailed test with a significance level of 0.05), then the instrument or question items have a significant correlation with the total score (considered valid) (Setyawan, 2013).

Reliability testing is used to determine the consistency of the measuring instrument, whether the measuring instrument used is reliable and remains consistent if the measurement is repeated. This can be demonstrated by the value of Cronbach's Alpha. The Cronbach's Alpha value is a reliability

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measure that ranges from zero to one (Jr, 2020). Besides being viewed based on Cronbach's Alpha, a reliable indicator can also be seen from the value of the correlated item-total correlation. Correlated item-total correlation can also be used to eliminate unreliable indicators in a variable. The minimum value for the correlated item-total correlation in an indicator to be considered reliable is 0.50. The results of the validity and reliability test indicate that the instrument items are valid and reliable."

Analysis Results

The analysis process is continued by simplifying the implementation based on the highest Pearson correlation values (see Table 3 and Figure 2). The highest indicators will be utilized to develop the Knowledge Management System.

Table 3: Results of Highest Pearson Correlation Analysis

Instrument		Value
KS1	Electronic Discussion	0,857
KC8	Computer Based Simulation Computer	0,856
KD2	Repository Information	0,842
KD10	Electronic Discussion Group	0,837
KD6	Web Portal	0,833

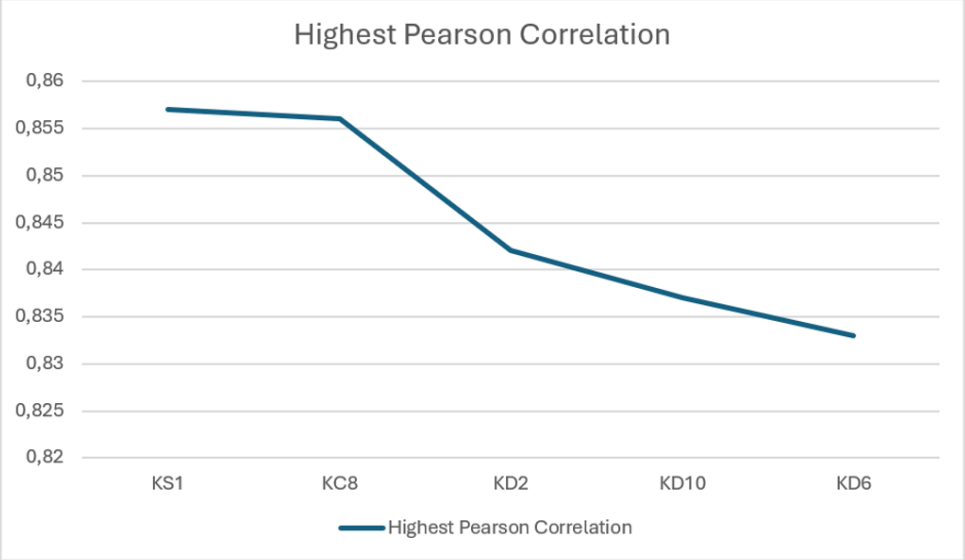

Figure 2: Highest Pearson Correlation

The analysis results indicate 5 instruments with the highest Pearson correlation, where the expected KM system is in the form of a web-based system with electronic discussion features and several features such as information repository. Based on the results of the previous analysis indicating the need for an electronic discussion system in the Knowledge Management System (KMS), a more in-depth analysis was conducted using the UML approach. UML (Unified Modeling Language) is a standard language used to model, document, and design software systems

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visually. UML is employed to depict the structure, behavior, interactions, and architecture of software systems (Alan Dennis B. H., 2012). The types of diagrams used include Use Case Diagrams, which illustrate the interactions between the system and external entities in the context of system functionality. The diagram is depicted with ovals (use cases) representing specific system actions and icons representing external entities (actors) that interact with the system. The relationships between use cases and actors are represented by lines (Alan Dennis B. H., 2012). Based on the in-depth analysis, the KMS has three main actors: Visitor, Admin, and Member, as shown in Figure 3.

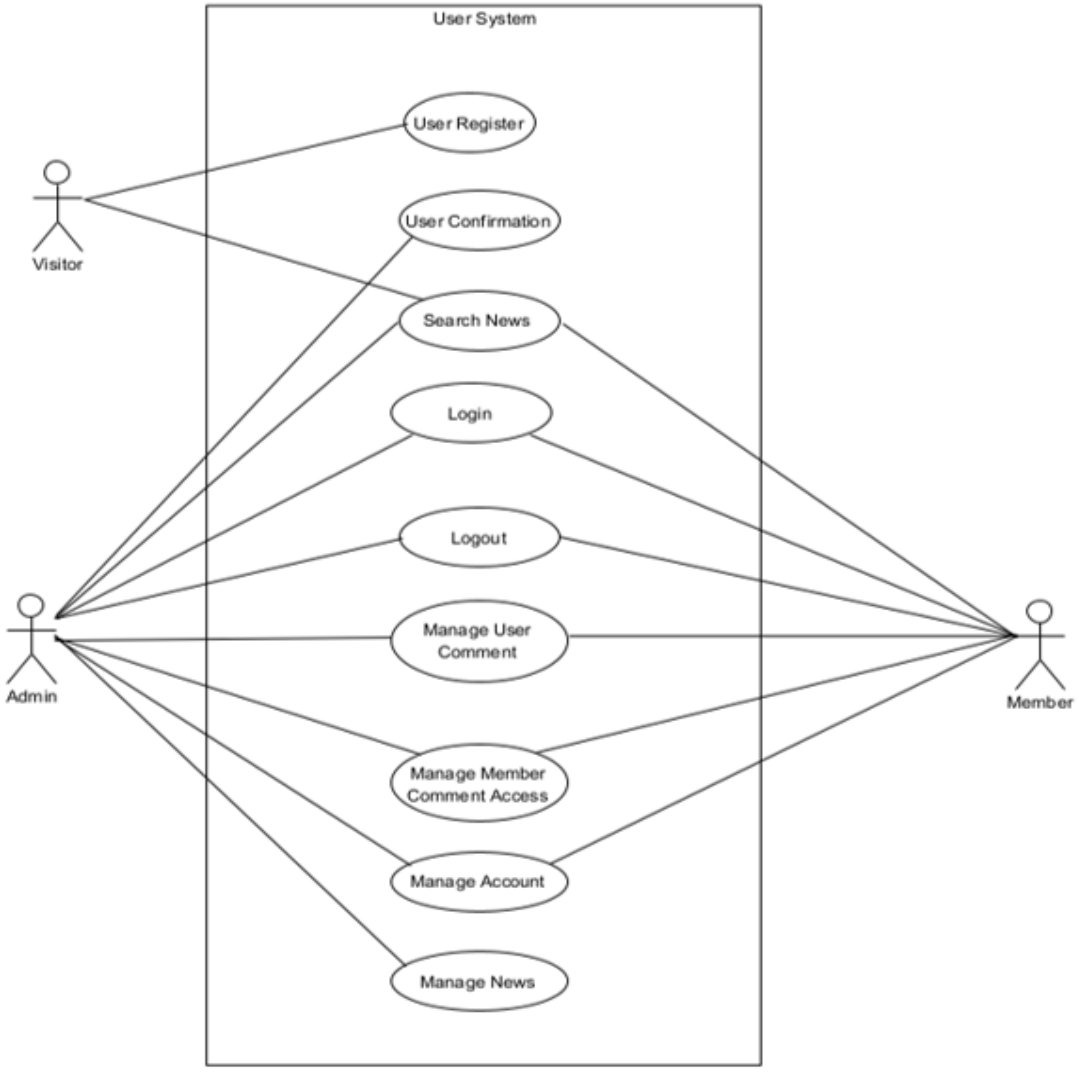

Figure 3: Use Case Diagram of KMS

In the previous KMS analysis, it was illustrated as a use case diagram with UML modeling containing main functions and their connections to actors. Subsequently, the results of this

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modeling were analyzed and further elaborated on the business process flow, depicted with an Activity Diagram. The Activity Diagram illustrates the modeling of the business process or activities of a system (Alan Dennis B. H., 2012). Activities within the KMS system begin with visitor registration. The registration form is then processed to confirm the data entered by the visitor. If the data is confirmed, the visitor can become a member and engage in discussions by asking questions or leaving comments for other members. The activity diagram for the discussion website can be seen in Figure 4.

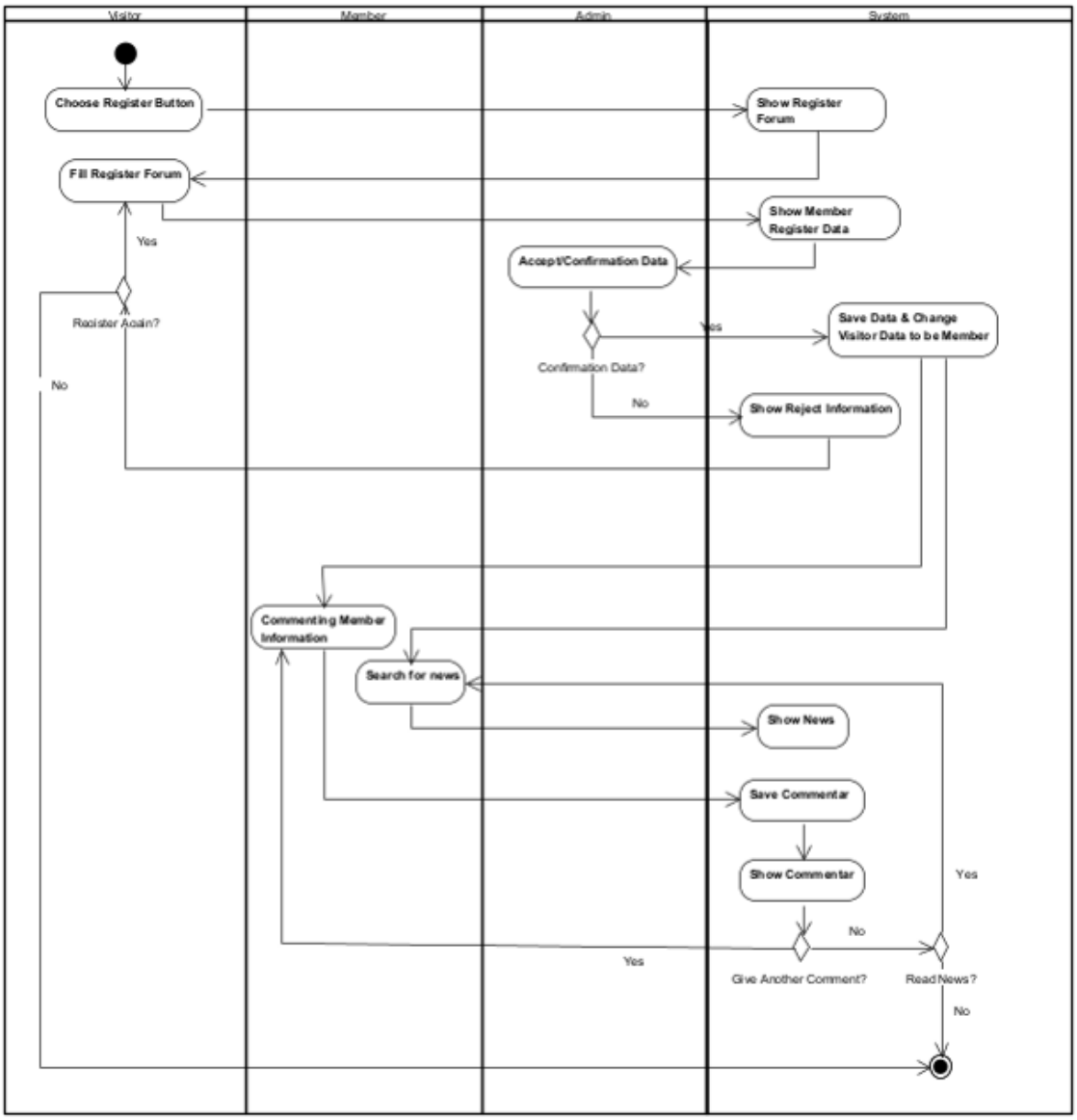

Figure 4: Activity Diagram of KMS

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CONCLUSION

This study aims to revitalize Indonesia's economic landscape with a focus on MSMEs and their adoption of knowledge management (KM). SMEvolution is a knowledge management technology aimed at simplifying the knowledge creation process, assisting MSMEs in embracing rapidly evolving digital technologies. The research was structured by identifying various characteristics of knowledge management activities within the MSME environment. These characteristics were gleaned from a survey utilizing a 37-question questionnaire sourced from relevant library materials. Quantitative methods were employed to analyze the survey results garnered from 103 MSME respondents in Indonesia. Data analysis utilized Pearson correlation analysis, which indicated that the anticipated Knowledge Management System (KMS) is envisioned in the form of a website capable of facilitating discussion processes within it. This finding could serve as a recommendation to implement a KMS web forum discussion, which can provide numerous benefits for users, including information exchange, learning, networking, and personal as well as professional growth. The design of the KMS in this research utilizes the Unified Modeling Language (UML) to visually depict the structure and interaction among system components.

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