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Implementation of Knowledge Management to Decision-Making in Property Development Companies

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ABSTRACT

The property industry faces challenges in managing knowledge dispersed across various departments, hindering efficiency and decision-making. To address this issue, the aim of this research is to develop Knowledge Management (KM) using the Rapid Application Development (RAD) method, which enables rapid and responsive system development according to organizational needs. By utilizing the SECI model to manage tacit and explicit knowledge, this KM prototype is capable of addressing knowledge fragmentation, improving information management efficiency, and supporting data-driven decision-making. This research concludes that embedding KM practices into decision-making frameworks not only enhances the efficiency and accuracy of decisions but also fosters a culture of continuous learning and innovation within property development companies. It highlights the necessity for tailored KM strategies, supported by leadership initiatives and robust technological infrastructure, to address industry-specific challenges. Future research should explore the integration of emerging technologies, such as artificial intelligence and big data analytics, to further optimize KM practices and their influence on decision-making in the property sector.

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1. INTRODUCTION

The property industry continues to evolve as a strategic sector that significantly contributes to the economy. However, the complexity of property projects involving various stakeholders, such as developers, contractors, and customers, creates challenges in managing organizational knowledge. Knowledge dispersed across different departments is often difficult to access or utilize optimally, thus hindering innovation and strategic decision-making [1]. Knowledge Management System (KMS) emerges as a technological solution that enables companies to manage, store, and distribute knowledge more effectively. However, many property companies face barriers in implementing KMS due to

knowledge fragmentation across departments, slow traditional system development processes, and lack of technology-based strategic tools suitable for industry needs [2][3][16].

The Rapid Application Development (RAD) method becomes a relevant approach to address these challenges. With a focus on rapid, iterative, and prototype-based system development, this method enables organizations to create technological solutions that are more responsive to dynamic business needs, thus supporting organizations in managing knowledge efficiently and responsively to market dynamics [4]. In the property industry, applying the RAD method to KMS can help organizations overcome knowledge fragmentation, reduce system development time, and provide relevant strategic tools to support data-driven decision-making [5].

Furthermore, the use of the SECI model (Socialization, Externalization, Combination, Internalization) becomes the main framework for understanding the knowledge conversion process within organizations. This model helps identify how tacit and explicit knowledge can be managed synergistically within the KMS system, thus enhancing organizational knowledge transfer and utilization [2].

This research aims to develop a KMS prototype using the RAD method designed to optimize organizational knowledge management in the property industry. This prototype is expected to address the challenges of knowledge fragmentation and slow traditional system development while providing an implementation model that can serve as a reference for other property companies. Additionally, this research offers a KMS implementation model that can be applied more broadly in the property sector, emphasizing knowledge transformation using the SECI model. This approach not only improves internal organizational efficiency but also potentially creates competitive advantages in facing global challenges [6][7].

Although previous research has discussed KMS implementation in various sectors, there remains a gap in the literature regarding KMS development specifically designed for the property industry using the RAD approach. Studies conducted by [8] focused on KMS implementation in the construction sector in general but have not specifically addressed the unique characteristics of the property industry. Meanwhile, research by [9] explored the use of the SECI model in knowledge transfer in real estate companies but did not consider system development aspects using agile methods like RAD. Research [10] has investigated project knowledge capture and reuse in construction organizations but has not integrated rapid and adaptive system development approaches. This research aims to fill these gaps by integrating RAD methods and the SECI model in developing KMS tailored to the specific needs of the property industry.

Based on this background, this research was conducted to develop a KMS platform called Propedia, designed to help access information about organizational knowledge management in supporting strategic decision-making. This research focuses on developing a KMS prototype using the RAD method by integrating the SECI model to optimize knowledge-based decision-making processes. The results of this research are expected to contribute both theoretically and practically. Theoretically, this research enriches the literature on KMS implementation as a strategic decision support tool in the property industry using a more adaptive system development approach. Practically, the resulting KMS can be a solution in addressing knowledge fragmentation issues and improving the quality of strategic decision-making through more structured and integrated knowledge management. Furthermore, the resulting implementation model can serve as a reference for other organizations in developing knowledge-based decision support systems tailored to their specific needs.

2. METHOD

This research applies Rapid Application Development (RAD) as its system development methodology, which is part of the System Development Life Cycle (SDLC) [11]. RAD is a linear sequential software development approach focusing on a very rapid development cycle [12]. This methodology was chosen for its ability to produce information systems that excel in terms of speed and accuracy while requiring more economical costs [13]. Several advantages considered in choosing RAD include: shorter

development time, high level of flexibility, ability to optimize user participation, and minimization of potential development errors [14].

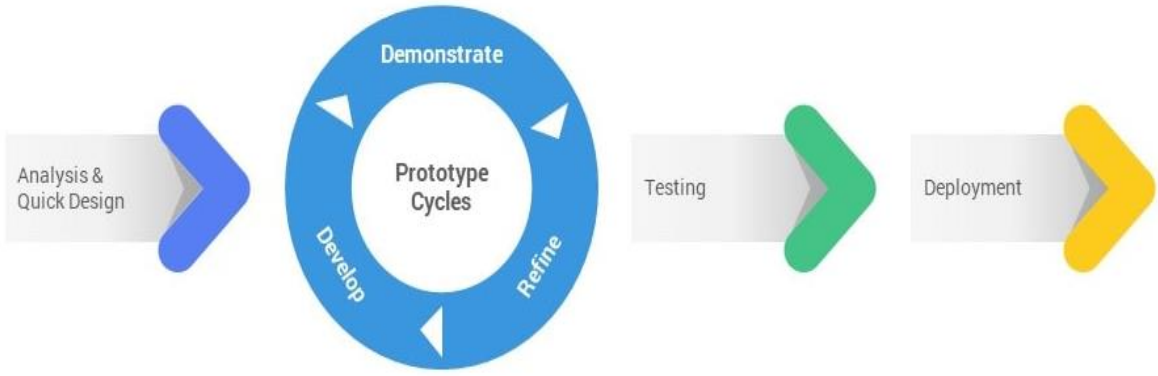

Figure 1. Rapid Application Development Method [15]

This development model consists of four main stages [15]:

1. Requirements Planning Phase, where developers and users meet to identify and analyze existing problems. This stage is crucial as it becomes the foundation for successful system development and prevents miscommunication between both parties.
2. User Design Phase, which involves creating system designs according to identified needs. This design is expected to provide solutions to existing problems. In this research, system design is visualized using Unified Modeling Language (UML) Tools.
3. Construction Phase, which is the implementation phase of the created design. At this stage, coding is performed to transform the system design into an operable application according to the initial planning.
4. Cutover Phase or comprehensive testing of the built system. Testing is conducted using the Black Box Testing method, a software testing technique that focuses on testing system functionality, with the aim of minimizing the possibility of system defects.

This table, methodology steps for knowledge management implementation using the SECI Model:

Table 1 SECI MODEL

Step	SECI Phase	Action	Description
1	Socialization	Facilitate tacit knowledge sharing through direct interactions.	Organize workshops, meetings, and informal discussions to enable employees to share personal insights and experiences.
2	Externalization	Convert tacit knowledge into explicit knowledge via documentation.	Use tools like templates, wikis, or structured reports to document best practices, ideas, and solutions systematically.
3	Combination	Aggregate explicit knowledge from multiple sources into comprehensive frameworks or systems.	Consolidate documents, reports, and databases into centralized repositories for easy access and integration.

Step	SECI Phase	Action	Description
4	Internalization	Encourage the application of explicit knowledge to enhance tacit knowledge.	Provide training, simulations, and hands-on activities to help employees internalize documented knowledge effectively.
5	Iteration	Continuously refine and iterate through the SECI phases to foster ongoing knowledge growth.	Regularly review processes, collect feedback, and update knowledge repositories to ensure relevance and adaptability.

Each poin explanantion:

1. Socialization:

Tacit knowledge, such as personal expertise or experiences, is difficult to articulate but essential for organizational growth. By fostering direct interactions through workshops, brainstorming sessions, or mentorship programs, organizations encourage the informal sharing of insights. This phase focuses on building trust and collaboration among team members.

2. Externalization:

This step involves transforming tacit knowledge into explicit forms, making it accessible to others. For instance, creating how-to guides, manuals, or visualizations like flowcharts can help articulate complex concepts. This phase ensures that individual knowledge is captured systematically and shared widely within the organization.

3. Combination:

The explicit knowledge gathered during externalization is synthesized and organized into structured systems, such as centralized databases or knowledge management platforms. This phase enhances organizational learning by integrating diverse knowledge sources into a unified framework for easy retrieval and use.

4. Internalization:

Employees apply explicit knowledge in practical settings to deepen their understanding and develop new tacit knowledge. Training programs, case studies, and on-the-job learning opportunities are key to this phase, ensuring that knowledge becomes ingrained in everyday practices.

5. Iteration:

Knowledge management is a continuous process. Regular feedback loops and updates to the SECI phases ensure that the knowledge remains current, relevant, and beneficial. Organizations must adapt their KM strategies to changing business needs, technologies, and industry trends.

By systematically following these steps, organizations can leverage the SECI model to create a dynamic and effective knowledge management system that supports innovation and decision-making.

3. RESULT AND DISCUSSION

3.1. Proposed Knowledge Management Analysis

3.1.1. Knowledge Flow Diagram

This diagram explains how knowledge flow is managed, starting from knowledge sources, storage, to distribution to support strategic decision-making, as shown in Figure 2.

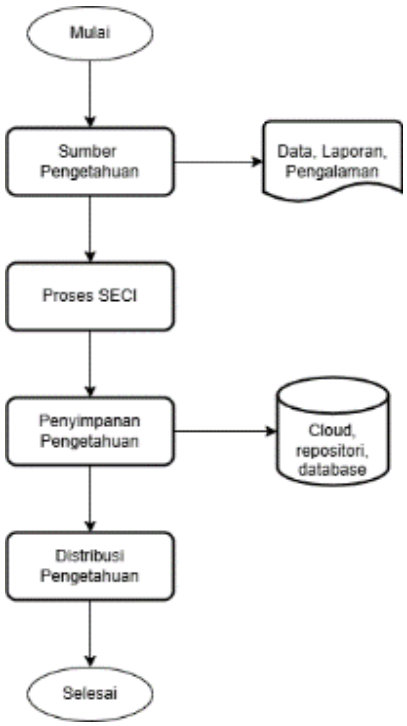

Figure 2. Knowledge Flow Diagram

Based on Figure 2 above, the Knowledge Management flow illustrates the knowledge management process from the initial stage to knowledge distribution. The process begins with collecting Knowledge Sources, which include data, reports, and employee experiences, as the main foundation for information management. Next, this information goes through the SECI Process (Socialization, Externalization, Combination, Internalization), which is a mechanism that transforms tacit knowledge into explicit knowledge or vice versa, making it easier to understand and utilize.

After processing, knowledge is stored in the Knowledge Storage stage, using media such as cloud, repositories, or databases. This stage ensures that knowledge is stored securely and easily accessible as needed. The stored knowledge is then distributed through Knowledge Distribution, which includes media such as dashboards, training, or reports. This process concludes by ensuring that distributed knowledge can be maximally utilized to support strategic decision-making. This flow demonstrates the interconnection between each stage to create effective and efficient knowledge management.

3.1.2. Proposed *Knowledge Management Team*

To support the sustainability of Knowledge Management System (KMS) implementation, a structured team is needed to ensure optimal knowledge management. This team aims to coordinate various aspects of KMS, from collection, management, storage, to knowledge distribution, to provide strategic contributions to the organization. The following is the proposed KMS team structure as shown in Figure 3.

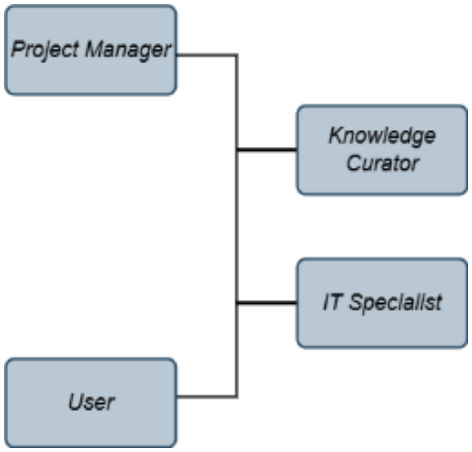

Figure 3. Proposed KM Teams

Explanation of functions for each position:

1. Project Manager

   As the coordination center, the Project Manager is responsible for the overall management of the KMS system. This role includes planning, implementation, and monitoring processes to ensure each stage in the system runs according to organizational objectives. The Project Manager also serves as a liaison between the KMS team and top management.

2. Knowledge Curator

   This role focuses on managing and filtering relevant knowledge. The Knowledge Curator is tasked with identifying, organizing, and validating information so that only quality knowledge is stored and distributed through the KMS. This is important to maintain the relevance and strategic value of knowledge accessed by users.

3. IT Specialist

   The IT Specialist is responsible for ensuring the technological infrastructure supporting KMS functions optimally. This role includes managing hardware and software, data security, and integrating the latest technology to support system performance. The stability and security of KMS heavily depend on the IT Specialist's expertise.

4. End-User Representative

   This role represents end-user needs in the KMS system. The End-User Representative provides input regarding user experience, ensures the system is accessible, and helps other teams understand operational needs. This is important to ensure that KMS truly supports users in their daily work.

3.2. KMS Analysis and Design

3.2.1. Identify Needs

To ensure that the developed Knowledge Management System (KMS) can meet organizational needs in the property industry, an important initial step is to identify the key requirements that must be fulfilled by the system. This identification aims to formulate relevant features and functions, so that KMS

can provide solutions to knowledge fragmentation problems, support collaboration, and accelerate strategic decision-making. The following is the proposed list of requirements as shown in Table 1.

Table 1. Identify Needs of KMS

Kode	Deskripsi Kebutuhan
R01	Knowledge search feature to help users easily find relevant information within the system.
R02	Knowledge sharing feature that enables users to share knowledge posts between departments or individuals.
R03	Forum feature for discussions that supports collaboration and idea sharing among stakeholders.
R04	External information provision feature through articles to update current insights and knowledge.
R05	Data-driven dashboard to provide knowledge summaries and support strategic decision-making.

3.2.2. KMS Feature Identification

In developing a Knowledge Management System (KMS), it is important to identify features that can support the knowledge management process according to organizational needs. The proposed features must accommodate various stages in the SECI model (Socialization, Externalization, Combination, Internalization), which includes knowledge collection, processing, storage, and distribution. This feature identification aims to ensure that the developed system is not only relevant to user needs but also capable of improving efficiency and effectiveness in knowledge management across the organization. The following is a list of proposed features based on identified needs as shown in Table 2.

Table 2. KMS Feature Identification

Fitur	S	E	C	I
Forum Discussion	☑			
Knowledge Sharing (Postings)	☑	☑		
External Knowledge (Articles)		☑	☑	☑
Dashboard			☑	☑

This table shows the relationship between proposed features and phases in the SECI model, with the aim of ensuring that the Knowledge Management System (KMS) can facilitate effective knowledge management in the organization.

- Socialization (S): Features that support the sharing of tacit knowledge through social interaction and collaboration. Features like Forum Discussion help team members share knowledge and experience directly.
- Externalization (E): Features that enable the conversion of tacit knowledge to explicit knowledge, such as those found in Knowledge Sharing (Postings) and External Knowledge Articles, which allow users to write and share knowledge explicitly.
- Combination (C): Features that organize and combine explicit knowledge from various sources. External Knowledge Articles assist in collecting and combining relevant information for users.
- Internalization (I): Features that allow users to learn and internalize explicit knowledge into their tacit knowledge. External Knowledge Articles features and Dashboard play important roles in this process, where discovered information can be used for learning and strategic decision-making.

3.2.3. *Use Case Diagram*

The Use Case Diagram provides a visual representation of the interaction between actors (users or external systems) with various features or services offered by the system, thus facilitating communication between developers and stakeholders in the design process. Based on the system requirements identification results, system modeling was performed using a use case diagram as shown in Figure 4.

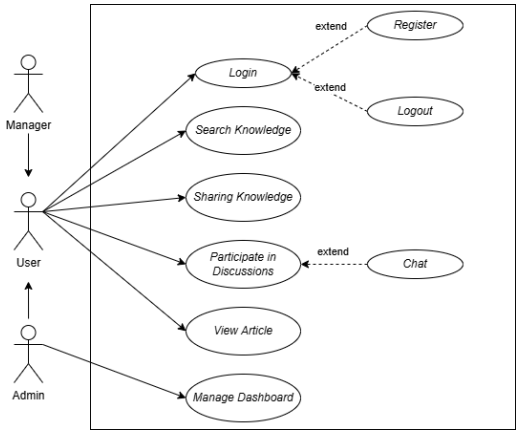

Figure 4. *Use Case Diagram*

This diagram broadly shows several main use cases that illustrate the interaction between users and the system, such as Register, Login, Search Knowledge, Sharing Knowledge, Participate in Discussions, View Article, Chat, and Manage Dashboard. These features are designed to support various user needs in knowledge management in property companies, ranging from searching for information, sharing knowledge, discussing, to overall system management.

3.2.4. *Class Diagram*

The Class diagram maps system elements, such as classes, attributes, methods, and relationships between classes, to provide a comprehensive representation of how the system will be implemented. The class diagram helps developers understand in detail how entities in the system interact with each other, as well as the main functions that support knowledge management in the company. The class diagram representation of the knowledge management system in this research is shown in Figure 5 below.

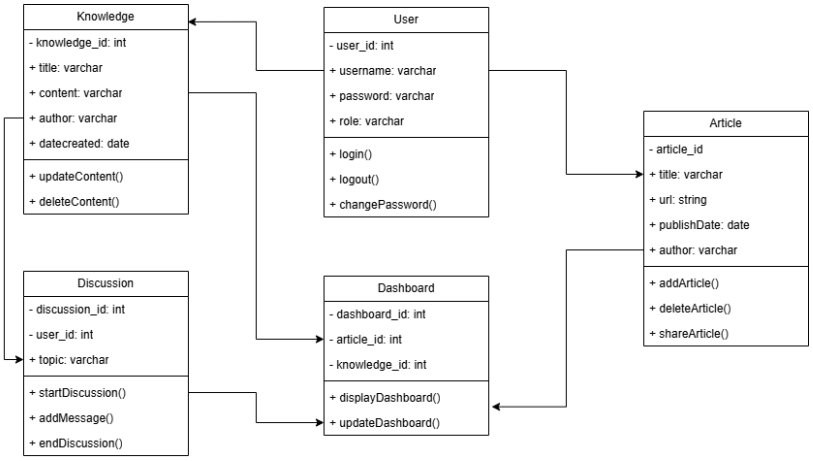

Figure 5. *Class Diagram*

The class diagram above illustrates the main structure of the Knowledge Management System (KMS) in the property field, which consists of five main classes: User, Knowledge, Article, Discussion, and Dashboard. The User class handles user authentication and roles, such as login and account management, while Knowledge and Article focus on managing knowledge and articles that can be updated, deleted, or shared. Discussion enables users to start, add to, and end discussions, supporting collaboration between users. Dashboard functions as a central display and management hub for articles

and knowledge. The relationships between classes show how data and functions are integrated to support efficient knowledge management within the system.

3.2.5. System Design Result

1. Dashboard Page Interface

The PROPEDIA dashboard homepage displays a clean and informative interface, starting with a header containing the main navigation menu ("Home," "Posts," "Articles," and "Forum"), a search column, and a user profile. The middle section highlights the PROPEDIA system name with a brief description of its function as a Knowledge Management System for property market trends. At the bottom, there is a "Login" button with an attractive gradient color that directs users to start exploring further data. The dashboard display can be seen in Figure 6 and Figure 7.

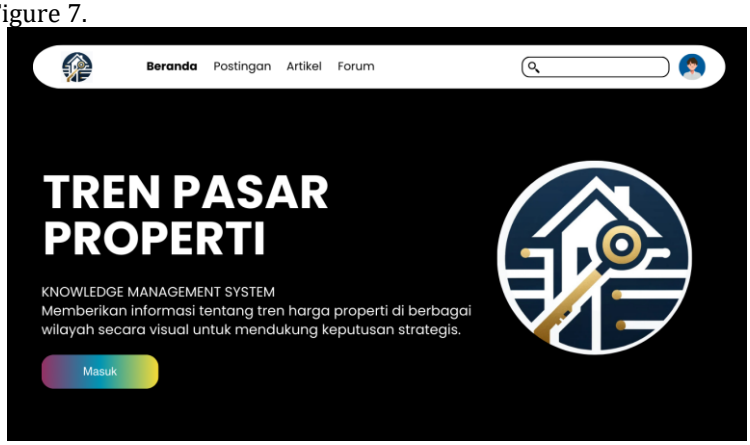

Figure 6. Dashboard Page Interface

This dashboard displays property price information interactively, starting with a search field for the area to customize the data. The graph shows the trend of average prices per square meter, while the large numbers next to it provide up-to-date information on the average property prices in the area. The donut chart shows the availability status of the property (available, sold, rented), and the pie chart shows the level of consumer interest in the surrounding area. All data is designed to provide a complete visual picture with the last update on November 2, 2024.

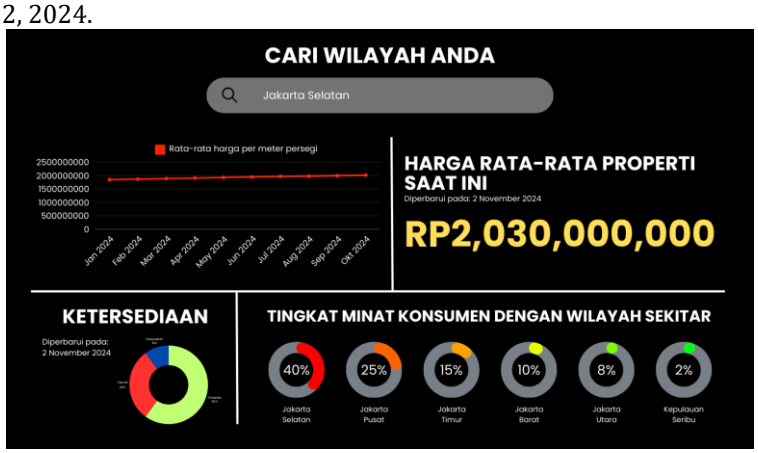

Figure 7. Dashboard Page Interface

2. Post Page Interface

This page is a Post feature in the system designed to facilitate discussions and sharing of property-related information. Users can create new posts through the input field at the top. Each post is equipped with interaction features, such as the number of comments, likes, and shares, to increase engagement. The left side displays the user profile with suggestions for property agents to follow, while the right side provides a list of trending hashtags in Jakarta to

facilitate exploration of popular topics. This design aims to create an interactive environment for users to share experiences, tips, or ask questions about property. The appearance of the post page can be seen in Figure 8.

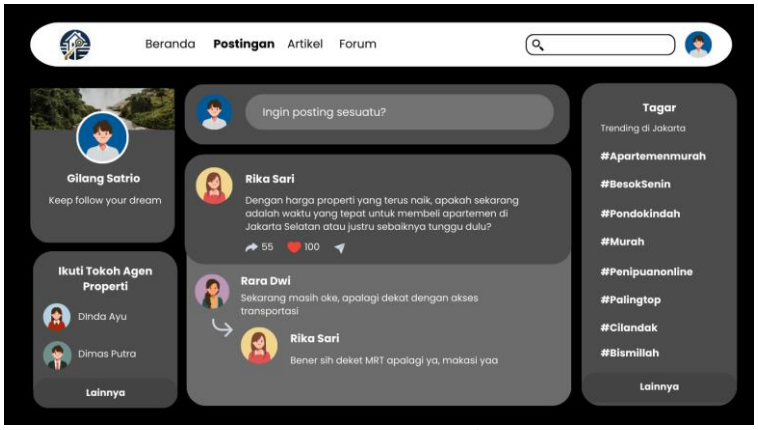

Figure 8. Post Page Interface

This page is an Article feature that provides various information related to property, such as price trend analysis, buying tips, and legality guides. Users can use the filter feature at the top to filter articles based on specific needs. Articles are displayed concisely with supporting images and text excerpts to make it easier for readers to choose relevant topics. The left section provides user profiles and recommendations for property agents to follow, making it easier to access insights from experts. The design of this page is designed to support a comfortable and informative reading experience. The appearance of the article page can be seen in Figure 9.

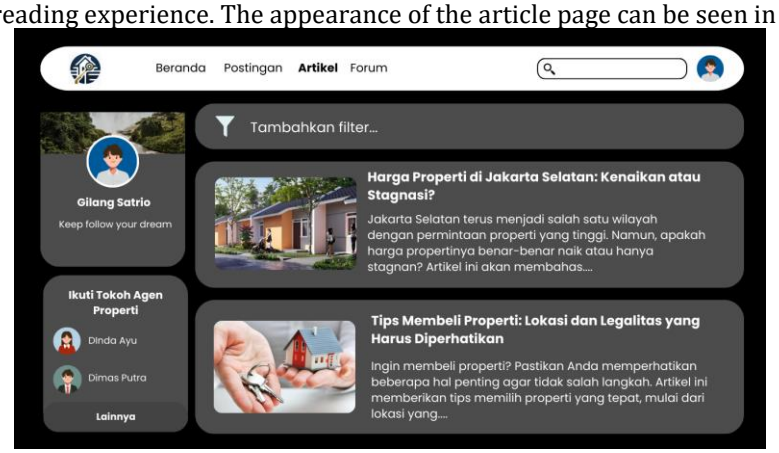

Figure 9. Article Page Interface

3. Forum Page Interface

This forum page is designed to facilitate user interaction in sharing information, exchanging messages, and discussing related communities, such as property price monitoring. There is a search feature to find relevant messages or communities, as well as additional filters to refine search results. The main forum displays a list of active discussions with titles, sender names, and excerpts from the message content. A simple interface with navigation buttons makes it easy for users to search for new communities or directly join ongoing discussions. The forum page display can be seen in Figure 10.

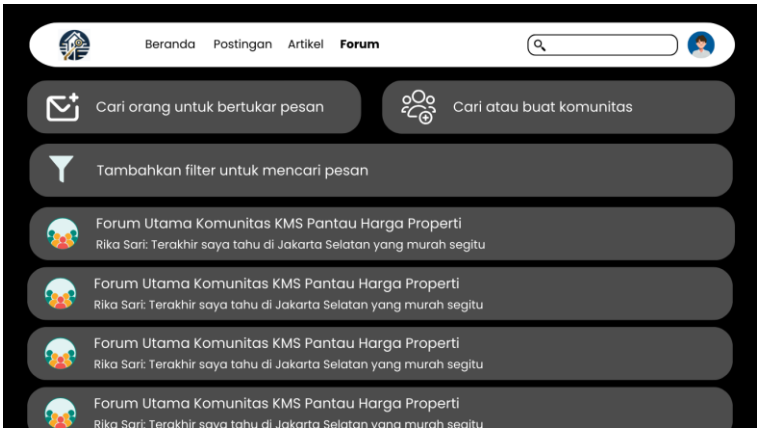

Figure 10. Forum Page Interface

4. CONCLUSION

From the results of this study, it can be concluded that the development of a Knowledge Management System (KMS) prototype designed for PT XYZ provides significant benefits in managing organizational knowledge. By implementing this prototype using the Rapid Application Development (RAD) method and the SECI model, the company can overcome knowledge fragmentation, increase the efficiency of cross-department collaboration, and support data-based strategic decision making. This system also allows for more effective knowledge transfer, both tacit and explicit, thereby increasing the competitiveness of the organization in the property industry. The novelty of this study lies in the integration of the RAD method with the SECI model in the development of a KMS specifically designed for the property sector. This approach provides an innovative solution to overcome the limitations of traditional system development and utilizes knowledge management in a more structured and integrated manner. In theory, this study enriches the literature on the implementation of KMS as a strategic decision support tool. In practice, this KMS prototype provides an implementation guide that can be a reference for other property companies to improve operational efficiency and competitiveness in the global market.

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