

SALES MANAGEMENT INFORMATION SYSTEM WITH SITE PLAN VISUALIZATION AT PT.ALESTA PROPERTY INDONESIA

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ABSTRACT

Housing consists of residential units equipped with adequate facilities, offering comfort and security. PT Alesta Property, a subsidiary of Alesta Group Indonesia, operates in housing development and sales but faces challenges in managing housing availability. Currently, information on availability, booking status, mortgages, and sales is only accessible via direct communication with administrators, leading to inefficiencies and errors. To address this, this research develops a web-based system using site plan visualization to display housing status clearly, minimizing miscommunication and enhancing transparency. A Customer Relationship Management (CRM) system is integrated to automate notifications, such as payment reminders and booking confirmations via WhatsApp, ensuring timely customer communication. The system improves efficiency in sales management, streamlines administrative processes, and enhances customer experience. Developed using the Waterfall method, it provides a structured approach to implementation. This research enables PT Alesta Property to optimize housing sales management and offer a more reliable and user-friendly experience for prospective buyers.

Key Words : *Housing Sales, Site Plan Visualization, CRM System, Web-Based Application, Sales Management.*

1. INTRODUCTION

The rapid growth of the property industry in Indonesia reflects the increasing demand for quality housing [1].

As a leading property developer, PT Alesta Property has a critical responsibility to provide not only high-quality housing but also an efficient management system to support its operations. However, the company currently faces several challenges in managing its housing developments, particularly in terms of information accessibility. The availability of housing units, booking status, mortgage processes, and sales transactions are currently obtained through manual communication with administrative staff, which increases the risk of miscommunication and delays in decision-making [2], [3].

Moreover, the absence of an interactive site plan visualization hinders the sales and marketing process, as potential buyers often struggle to visualize the housing layout and available units, which may impact their purchasing decisions [4].

Studies show that digital transformation in real estate can enhance customer engagement, improve operational efficiency, and provide a better overall purchasing experience [5], [6].

By integrating an advanced information system, PT Alesta Property can efficiently manage housing location data, improve operational efficiency, and enhance transparency for prospective buyers and other stakeholders [7].

An interactive dashboard will allow users to access real-time availability status, facilitating informed decision-making for both the company and its customers [8], [9].

Additionally, interactive site plan visualization enables deeper analysis of sales performance, allowing

the company to formulate more effective marketing strategies [10].

Beyond site plan visualization, this system will also incorporate a Customer Relationship Management (CRM) feature that enhances customer engagement through automated reminders and purchase confirmations via WhatsApp notifications [11].

CRM integration in property sales has been proven to improve service quality and foster long-term customer relationships, ultimately boosting customer satisfaction and loyalty [12].

Digital platforms with automated notifications ensure timely updates, reducing customer uncertainty and increasing trust in the purchasing process [10].

This research aims to design and develop a housing sales information system with site plan visualization that can be effectively implemented at PT Alesta Property. By leveraging advanced digital solutions, this system is expected to enhance sales efficiency, streamline marketing efforts, and provide a superior customer experience [13], [14].

Moreover, the findings of this research can serve as a valuable reference for other property developers seeking to implement similar technological advancements in their operations [15].

A well-integrated information system is crucial for improving transparency, operational efficiency, and overall competitiveness in the real estate industry [16].

Ultimately, this study aspires to contribute to the digital transformation of the real estate sector and reinforce PT Alesta Property's ability to adapt to the dynamic property market [17], [18].

2. LITERATURE REVIEW

2.1. Definition Informartion System

An information system is an organized framework within an organization designed to facilitate daily transaction processing, support operational activities, and enhance managerial and strategic functions. Additionally, it provides specific reports for external stakeholders who require relevant data. An information system comprises several essential components, including hardware, software, procedures, human resources, databases, as well as computer networks and data communication systems [19].

These components work together to ensure seamless data management, improve decision-making processes, and optimize overall organizational performance [20].

2.2. Fundamental Concepts of Customer Satisfaction and Loyalty

Customer satisfaction is a key factor in establishing long-term relationships between a company and its customers [21].

It is closely linked to customer loyalty, which provides significant benefits for both parties [22], [23].

Customer loyalty refers to a strong commitment to continuously purchase or support preferred products or services in the future. This loyalty fosters repeat purchases and reduces customers susceptibility to competitors marketing strategies. A high level of customer satisfaction enhances trust, strengthens brand attachment, and ultimately contributes to the company's sustainable growth and competitive advantage [24].

2.3. Fundamental Concepts of Housing Sales Information Systems

Housing sales refer to the process in which property owners transfer ownership rights to buyers through a series of stages, from marketing to transaction closure [25].

This process involves multiple stakeholders, including property owners, prospective buyers, notaries, and financial institutions, who collaborate to finalize agreements and complete property transactions [26].

A housing sales information system is a crucial tool for companies aiming to enhance the efficiency and effectiveness of their sales operations. By integrating various processes and sales-related data, this system enables companies to manage transactions more effectively, improve customer service, and make data-driven decisions with greater accuracy [27].

Implementing a well-structured information system not only streamlines administrative tasks but also strengthens the company's ability to respond to market dynamics and customer demands.

2.4. Fundamental Concepts of Housing Sales Information Systems

This study employs Customer Relationship Management (CRM) success indicators to assess customer satisfaction in the design and development of a Housing Sales Management Information System at PT Alesta Property Indonesia [28].

The primary metric used is the Customer Satisfaction Rate (CSR), evaluated through the Customer Satisfaction Score (CSAT) [29], [30].

Customer Satisfaction Score (CSAT) is a key metric derived from a series of survey questions designed to measure how well a product or service meets customer expectations. Beyond assessing satisfaction, CSAT also captures insights related to pricing perception and customer loyalty. As a powerful indicator, CSAT enables companies to better understand customer needs, gauge sentiment towards products, and segment customers based on their expectations [31].

The benefits of implementing CSAT include reducing customer churn, increasing revenue from existing customers, and strengthening customer loyalty. By leveraging this metric, businesses can refine their strategies to enhance service quality and foster long-term relationships with customers. The detailed calculation of customer satisfaction is illustrated in Figure 1.



Figure 1. Customer satisfaction score (CSAT)

The Customer Satisfaction Score (CSAT) is calculated using the following formula:

$$\text{CSAT}(\%) = \frac{P}{N} \times 100\% \quad (1)$$

Where:

CSAT = Customer Satisfaction Score

N = Total number of respondents

P = Number of respondents who provided a positive or satisfied rating

In this formula, P/N represents the ratio of satisfied respondents, while multiplying by 100% converts the ratio into a percentage. For example, if 80 out of 100 respondents provide a positive rating, the CSAT score will be 80%:

$$\text{CSAT} = \frac{80}{100} \times 100 = 80\% \quad (2)$$

This formula allows companies to determine the percentage of customers who are satisfied with their products or services. A high CSAT score indicates that

the product or service meets or even exceeds customer expectations, helping businesses identify their strengths and maintain a competitive advantage. By continuously monitoring CSAT, companies can refine their offerings, enhance customer experience, and drive long-term customer loyalty.

2.5. Definition WhatsApp

WhatsApp is an instant messaging application designed for smartphones, enabling users to send not only text messages but also images, voice recordings, and videos [32].

It serves as an online communication platform similar to traditional short message services (SMS), which have become less commonly used [33].

Unlike SMS, WhatsApp operates using an internet connection rather than cellular credit, making it a more cost-effective and efficient communication tool [34].

Its widespread adoption and user-friendly interface have positioned WhatsApp as one of the most popular messaging applications globally, facilitating seamless and real-time communication across various devices and networks [35], [36].

3. RESEARCH METHODOLOGY

To ensure the attainment of research objectives, a well-defined and systematic methodology is essential. Thus, this study employs a structured research approach along with appropriate data collection techniques [37].

Which are outlined as follows:

3.1. Primary Data Sources

Primary data is obtained through direct data collection methods based on real-time observation and documentation of the research object [38]. The primary data sources include.

a. Observation

Data collection is conducted through direct observation of buildings and locations. This process involves simultaneous on-site observations and surveys to ensure accuracy and reliability [39].

b. Interviews

This method involves conducting direct interviews with internal housing management and key stakeholders in unit sales, such as the marketing department. These interviews provide valuable insights into the sales process and operational challenges [40].

3.2. Secondary Data Sources

Secondary data sources refer to information obtained from existing literature, documentation, and published materials. These sources include:

a. Literature Review

Literature review involves collecting data from books and academic sources that discuss topics related to the research problem, such as

publications on personal finance systems. Relevant literature can be obtained from books, research papers, and reputable websites [41].

b. Documentation Study

Documentation study is a research method that involves analyzing existing documents to extract meaningful insights and conclusions. This approach helps in understanding previous findings and theories related to the study [42].

3.3. Use Case Diagram

The System Use Case Diagram is a diagram that describes how actors perform business activities exclusively through the system. The representation of the System Use Case Diagram can be seen in Figure 2 below.

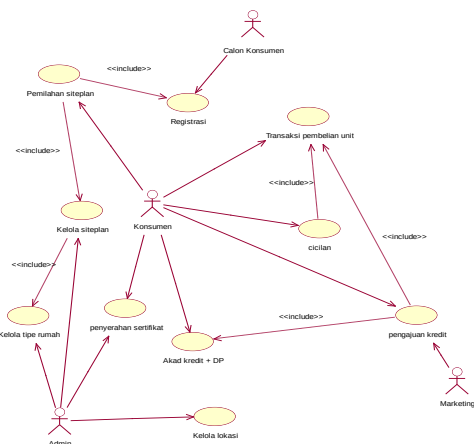


Figure 2. Use case diagram

3.4. Class Diagram

The Class Diagram is a diagram that illustrates the classes formed within the designed system and their relationships. The Class Diagram at the design stage of developing the Residential Plot Management Information System is presented as follows. The representation of the Class Diagram can be seen in Figure 3 below.

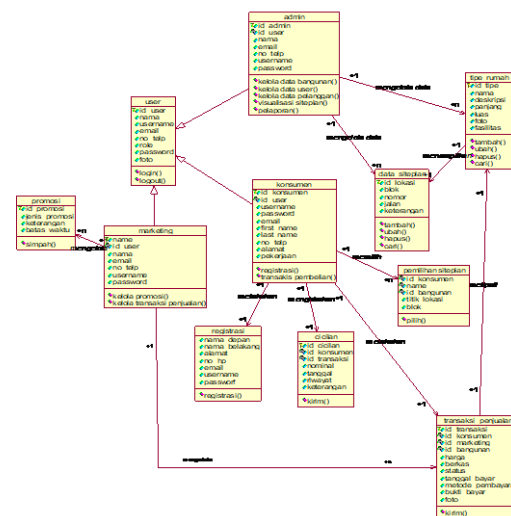


Figure 3. Class diagram

3.5. Entity Relationship Diagram

The Entity Relationship Diagram (ERD) is a diagram used for database design to illustrate relationships between entities or objects along with their attributes. The ERD provides a structured and organized representation of the database system, making it easier for users to understand. In designing the database system, the ERD was created using Microsoft Visio, following the framework outlined below. Figure 4 illustrates the step-by-step procedure used in developing the ERD, aiming to create an efficient and well-structured database management system.

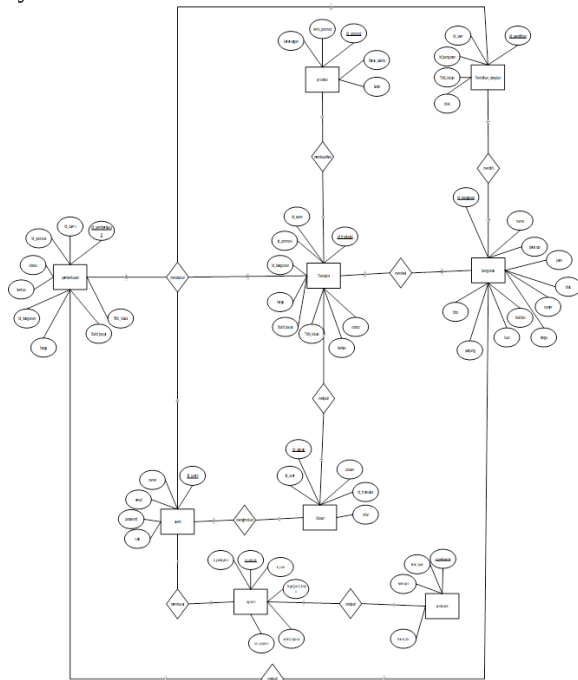


Figure 4. Entity relationship diagram

4. RESULT AND DISCUSSION

4.1. Implementation of The System

The system implementation phase is the process of applying the results of system development. At this stage, the initial design is translated into lines of program code, ensuring that the system functions as intended. The user interface of the Housing Sales Management Information System with Site Plan Visualization at PT. Alesta Property Indonesia is developed using the PHP programming language and the Laravel framework. Additionally, supporting software such as Visual Studio Code is utilized for system development, while a web browser is used to display and access the system's web-based interface. This implementation ensures a seamless and efficient transition from system design to operational deployment.

4.2. Login page

The Login Page serves as the entry point to the system, allowing authorized users to access its features

securely. The interface and functionality of this page can be seen in Figure 5 below.

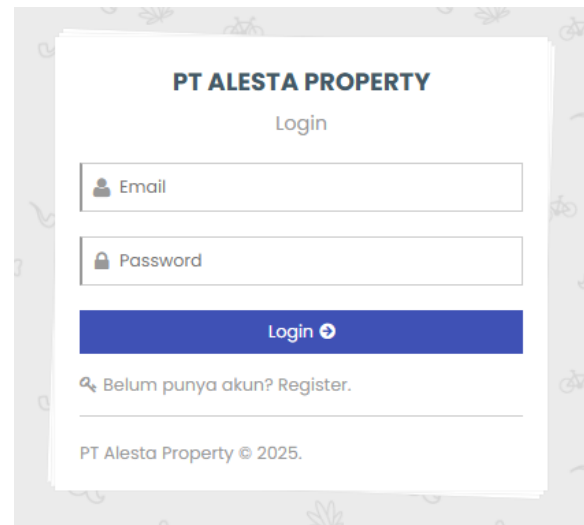


Figure 5. Login page

4.3. Admin Dashboard Page

The Admin Dashboard Page provides administrators with a comprehensive overview of the system's data. This dashboard displays a summary of all incoming data, enabling efficient monitoring and management. The interface and features of this page can be seen in Figure 6 below.



Figure 6. Dashboard page layout

4.4. Building Page

The Building Page allows administrators to view all recorded building data that has been entered into the system. This page ensures accurate data management and accessibility. The interface and details of this page can be seen in Figure 7 below.

The image shows a 'Building' page with a table of building data. The table has columns: 'No', 'Name', 'Address', 'Area', 'Status', 'Price', 'Type', 'Location', 'Status', 'Action'. The data rows show various building entries with their respective details.

No	Name	Address	Area	Status	Price	Type	Location	Status	Action
1	Alesta House	A	1	100%	10000000	House	100%	100%	View Edit
2	Alesta House	A	2	100%	10000000	House	100%	100%	View Edit
3	Alesta House	A	3	100%	10000000	House	100%	100%	View Edit
4	Alesta House	A	4	100%	10000000	House	100%	100%	View Edit
5	Alesta House	A	5	100%	10000000	House	100%	100%	View Edit
6	Alesta House	A	6	100%	10000000	House	100%	100%	View Edit
7	Alesta House	A	7	100%	10000000	House	100%	100%	View Edit
8	Alesta House	A	8	100%	10000000	House	100%	100%	View Edit
9	Alesta House	A	9	100%	10000000	House	100%	100%	View Edit
10	Alesta House	A	10	100%	10000000	House	100%	100%	View Edit

Figure 7. Building page

4.5. Payment Verification Page

The Payment Verification Page enables administrators to manage payment data efficiently, allowing them to verify each housing transaction. This feature ensures accuracy and transparency in the

payment process. The interface and functionality of this page can be seen in Figure 8 below.

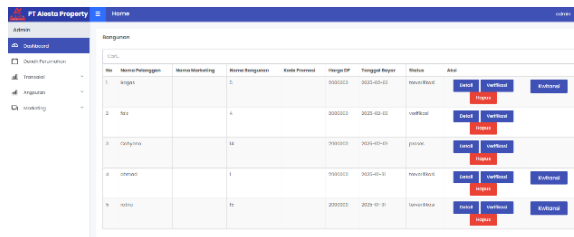


Figure 8. Payment verification page

4.6. Customer Landing Page

The Customer Landing Page serves as the main interface displayed to users after logging in. This page provides an overview of the available menu options, ensuring easy navigation and accessibility. The layout and features of this page can be seen in Figure 9 below.

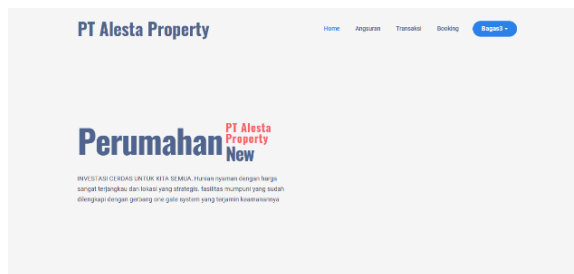


Figure 9. Customer landing page

4.7. Building List Page

The Building List Page allows customers to view the available housing options and select a property based on their preferences and needs. The interface and features of this page can be seen in Figure 10 below.

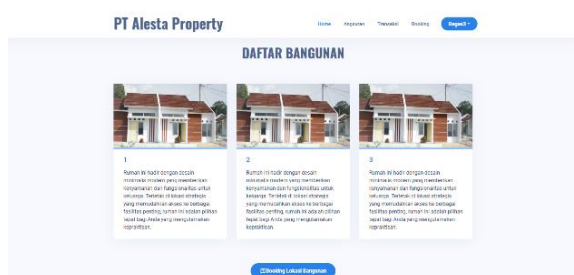


Figure 10. Building list page

4.8. Report Card Page

The Site Plan and Purchase Status Page allows customers to view the layout of their selected property while also displaying the current purchase status. This feature provides transparency and helps customers track their transaction progress. The interface and details of this page can be seen in Figure 11 below.



Figure 11. Site plan and purchasing status page

4.9. Boking List Page

The Booking List Page enables customers to enter the necessary information required for reserving a property. This feature streamlines the booking process and ensures accurate data collection. The interface and functionality of this page can be seen in Figure 12 below.

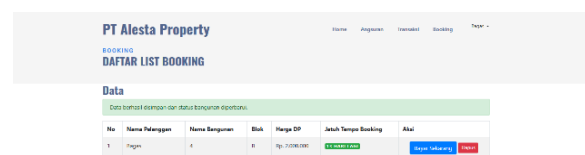


Figure 12. Boking list page

4.10. Payment Verification Page

The Payment Verification Page is used for the payment review process, allowing customers to check their payment status while awaiting verification by the administrator. The interface and details of this page can be seen in Figure 13 below.

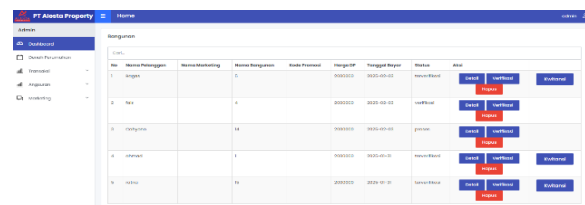


Figure 13. Payment Verification Page

4.11. Customer Landing Page

The Customer Review Page allows customers to provide feedback regarding their purchasing experience through the SITEPLAN system. This feature helps assess customer satisfaction and improve service quality. The interface and details of this page can be seen in Figure 14 below.



Figure 14. Customer review page

The system was tested using blackbox testing, covering user data management, location data management, and payment proof management. The results confirm that the system correctly processes

valid inputs while displaying appropriate warnings for errors. However, some incorrect inputs were accepted, indicating areas that require further improvement in validation handling.

Table 1. Blackbox testing

No	Function Tested	Scenario	Expected Result	Result
User Data Management				
1	Correct Input	User enters valid data and submits	User data successfully added	Successful
2	Duplicate Username	User enters an already registered username	Warning: "Username already registered"	Failed (Accepted duplicate username)
3	Empty Fields	User submits without entering data	Warning: "Field must be filled"	Failed
Location Data Management				
1	Correct Input	User enters valid location data and submits	Location data successfully added	Successful
2	Empty Form	User attempts to select without filling details	Warning: "Data has not been filled"	Failed
3	Missing Input	Admin submits without entering data	Warning: "Field must be filled"	Failed
4	Incorrect Data Type	Admin enters an invalid format (numeric location, text ID)	Warning: "Field format is incorrect"	Failed
Payment Proof Management				
1	Correct Input	User uploads valid payment proof and submits	Payment proof successfully added	Successful
2	No Action	User leaves form blank and returns	No action performed by system	Failed
3	Missing Input	User submits without uploading payment proof	Warning: "Field must be filled"	Failed

5. CONCLUSION AND RECOMENDATION

The Sales Management Information System with Site Plan Visualization at PT Alesta Property Indonesia has successfully addressed key challenges in housing sales management by improving operational efficiency, customer experience, and transaction transparency. Through real-time data automation and centralized information management, the system significantly reduces manual workload, response times, and administrative errors, leading to a more streamlined and accurate sales process. The integration of interactive site plan visualization enhances the customer experience by providing a clear and intuitive representation of property availability, which in turn increases buyer confidence and facilitates better decision-making.

Furthermore, the incorporation of Customer Relationship Management (CRM), particularly through automated WhatsApp notifications, ensures seamless communication, keeping customers informed throughout the purchasing process. Beyond improving efficiency and transparency, the system also supports data-driven sales performance analysis, enabling PT Alesta Property Indonesia to refine marketing strategies and business decisions based on real-time insights. The system lays a strong foundation for further advancements, such as expanded CRM functionalities, enhanced sales analytics, and additional process automation, which can further optimize operational effectiveness and strengthen the company's position in the real estate industry. With continuous refinement and adaptation, this system can serve as a model for future digital transformation efforts in property sales management, helping

businesses navigate industry challenges and maintain a competitive edge in an evolving market.

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