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Operational Efficiency Of Branz Mega Kuningan Apartment Based On A Property Management Information System (PMIS)

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Abstract: *Apartment residences currently face increasing demand for efficiency, transparency, and responsiveness in their operations. Traditional approaches, which are often manual or fragmented, frequently lead to delays in maintenance response, billing errors, poor record-keeping, and low resident satisfaction. This research proposes the design and implementation of a Property Management Information System (PMIS) tailored to apartment operational needs. The system integrates modules for resident profile management, facility and maintenance scheduling, billing and payment processing, complaint and request tracking, and an analytical reporting dashboard. This study aims to evaluate the operational efficiency of BRANZ Mega Kuningan Apartment following the implementation of the Property Management Information System (PMIS). The main focus of the research is to analyze the PMIS's impact on facility maintenance management, security, resident complaint management, and resource allocation. The method employed in this study is descriptive qualitative with data collection techniques through literature review, documentation, and SWOT analysis. The literature review was conducted to understand the theories and concepts related to PMIS and operational efficiency. Documentation was used to collect secondary data on the operational processes and PMIS implementation in the apartment. The SWOT analysis was performed to identify the strengths, weaknesses, opportunities, and threats in operational management post-PMIS implementation. The research findings indicate that the PMIS implementation has improved operational efficiency, with increases in maintenance response speed, reduction in facility downtime, and improved resident satisfaction. However, challenges exist regarding system integration and the need for advanced staff training. This study suggests the necessity of periodic evaluation and user capacity building to optimize the benefits of the PMIS.*
Keywords: *Property Management Information System; Apartment Operations; Facility Maintenance; Billing & Payment System and others.*

INTRODUCTION

In recent years, apartment living has become increasingly popular in urban areas worldwide, driven by rapid population growth and the need for efficient land use. However, managing apartment complexes presents significant operational challenges. Administrators must handle a variety of interrelated tasks - such as managing resident data, maintaining

facilities, billing and payment collection, handling complaints, coordinating security, and other general administrative duties. When performed manually or with a fragmented system, these tasks often lead to inefficiency, delays, inconsistency, and decreasing resident satisfaction.Rising expectations from residents for high-quality service demand processes that are more transparent, faster, and reliable. Traditional paper-based or spreadsheet-based systems are prone to errors, lack integration, and make real-time monitoring extremely difficult. As a result, management is often reactive rather than proactive, leading to delays in maintenance, billing disputes, and poor record-keeping. To address these problems, this paper proposes the implementation of a Property Management Information System (PMIS) specifically designed to meet the operational needs of an apartment complex. This PMIS will integrate various functional modules - resident profile and contract management, facility scheduling and maintenance, billing and payments, complaint/request tracking, as well as an executive dashboard for analytics and decision-making support. By combining these modules into a single coordinated digital platform, the system aims to streamline operations, reduce duplication of work, improve service levels, and enable data-driven management. In this study, we describe the system architecture and modules, outline a methodology for implementation in a real apartment complex, and present evaluation results comparing operational metrics before and after system deployment. Evidence shows that a well-designed PMIS can significantly improve operational efficiency, enhance responsiveness to residents, and support better decision-making. Ultimately, this work contributes to the development of knowledge about how information systems can transform property management in the modern era.

This study aims to gain a deeper understanding of the implementation of a Property Management Information System (PMIS) at the **BRANZ Mega Kuningan Apartment Complex**. The research does not only observe the technology used, but also assesses the impact experienced by the company through the deployment. The detailed objectives are as follows:

1. To measure the effect of PMIS implementation on maintenance response time at BRANZ Mega Kuningan apartment.
2. To evaluate changes in the number of tenant complaints before and after the use of PMIS at BRANZ Mega Kuningan.
3. To analyse the influence of the intensity of PMIS feature usage by tenants on tenant satisfaction levels at BRANZ Mega Kuningan.
4. To compare the unit vacancy rate before and after PMIS implementation at BRANZ Mega Kuningan.
5. To identify obstacles and supporting factors in the implementation of PMIS in the operational management of BRANZ Mega Kuningan apartment

LITERATURE REVIEW AND THEORY

The theoretical foundation of this research draws on several key works in facility management and digital building technologies: The conceptual framework of Digital Twin conceptual framework for the O & M process of cubature building objects by Borkowski (2023) broadly discusses a conceptual framework for applying Digital Twin (DT) technology during the Operation & Maintenance (O&M) phase of cubature building objects. Additionally, the model Model Based Facility Management Framework for Existing Building by Duong & Lin (2022) addresses how to overcome major challenges in facility management (FM) for existing buildings - particularly the lack of historical data/archive and incomplete technical drawings or design documents, which complicate information flows for maintenance and operations.

Further, studies such as Apartment Rental Management System for Real Time Transaction and Task Organization (Magno, Pelayo & Soberano, 2024) describe the development of an apartment rental management system that emphasizes real-time transactions and task organization for unit management.
In a broader context, the work The contribution of Industry 4.0 technologies to facility management (Nota, Peluso & Lazo, 2021) explores how Industry 4.0 technologies contribute to transforming facility management, while other studies look at aspects such as occupancy

detection via deep learning in smart residential buildings, safety and health practices in building environments integrating facility management, physical environment, and worker perception, and so on. More specifically, the Digital Twin (DT) paradigm as proposed by Borkowski (2023) becomes a crucial foundation for this research: DT offers a digital representation of the physical building - combining spatial (geometric) and non-spatial data - which simplifies asset management during the O&M phase. By leveraging up-to-date technologies such as the Internet of Things (IoT) and Artificial Intelligence (AI), the DT model enables real-time monitoring of building conditions, mitigates risk of data loss, and increases efficiency and productivity in asset management. As a complement, the concept of Building Information Modeling (BIM) is also regarded as highly relevant - as many facility management and building-maintenance literatures note - because BIM provides a 3D digital representation of the physical and functional characteristics of a facility. BIM serves as a "shared knowledge source" through the entire lifecycle of a building. The integration of BIM and DT enables a transition from static/manual documentation to a dynamic information management system: building data - from layout and structural specifications to maintenance records - can be managed in a unified, integrated way, facilitating planning, execution, and control in operations & maintenance. Therefore, by integrating the theory of DT and BIM within the framework of facility management (FM), this research rests on a strong conceptual base to analyze the implementation of a property/facility management information system (PMIS/FM system) for buildings - especially regarding how digital systems can improve efficiency, transparency, and sustainability of building O&M. This approach allows the study to assess not only technical aspects of implementation, but also informational, data, and process aspects of facility management in a holistic manner

RESEARCH METHODOLOGY

This study is designed as a descriptive qualitative research, aiming to provide an in-depth description of the conditions, processes, and factors influencing the implementation of a Property Management Information System (PMIS) at the subject company. This approach is chosen because it allows the researcher to understand the phenomenon in its real context and capture the complexity of internal company dynamics - not just quantitative data.

1. Data Sources and Data Collection Techniques

Data are collected through two main channels:

- **Literature review and company documentation**: This involves gathering internal company documents such as system implementation reports, operational procedures, the PMIS manual, as well as historical data related to property management. This technique helps to obtain a comprehensive picture of company policy, structure, and track record.
- **Qualitative primary data**: If feasible (depending on the scope of the research), the researcher may conduct in-depth interviews with management, operational staff, or system users - or direct observation in the workplace environment - to capture perceptions, experiences, obstacles, and dynamics related to PMIS implementation. Methods like semi-structured interviews and/or participant observation are often used in qualitative research.

Thus, the research relies both on secondary data (documentation/literature) and primary data (informants' experiences, if used), to obtain a rich and contextual picture.

2. Data Analysis Process - Qualitative Descriptive Approach and SWOT Analysis

After data collection, the subsequent steps are:

- **Data Reduction**: Selecting and summarizing important information from documents and interview/observation transcripts. Information relevant to internal and external aspects of PMIS implementation is categorized and synthesized.
- **Data Display (Data Presentation)**: Presenting results of observations, documentation, and interview findings in descriptive narrative form - possibly assisted by tables or diagrams where needed - to facilitate understanding.
- **SWOT Analysis**: Based on the organized data, the researcher identifies internal factors (strengths and weaknesses) and external factors (opportunities and threats)

related to PMIS implementation. This analysis is used to evaluate how effective the implementation has been, the potential for success, and possible challenges.

- **Conclusion Drawing**: From the SWOT map and contextual description, the researcher will conclude the condition of PMIS implementation - for example, supporting and inhibiting factors - and provide strategic recommendations to optimize the PMIS deployment.

3. Validity and Reliability of Data

To ensure the reliability and credibility of the findings, this study applies principles of validity in qualitative research: for instance, through data triangulation (comparing company documents, literature, and data from interviews/observations); reflection on possible researcher bias; and systematic documentation of the process so that the results can be traced back. In this study, we focus on measuring and analyzing time efficiency in two operational approaches: the traditional manual method and the implementation of a Property Management Information System (PMIS). By comparing workflows, time required, and obstacles in each system, this study aims to identify the extent to which PMIS can accelerate processes, reduce redundancy, and improve operational productivity compared to the conventional approach. In the operations at BRANZ Mega Kuningan, to submit permits and job progress approvals the following time is required under the manual process: the submission process takes 30 minutes, the section-head approval process takes 50 minutes (10 minutes per section head), and sending the approved documents to the related parties takes 30 minutes. Thus, if the permit submission is done manually, the total time required is 110 minutes. Meanwhile, if carried out using a Property Management Information System (PMIS): the submission process requires 15 minutes, the section-head approval process requires 25 minutes (5 minutes per section head), and sending the approved documents to related parties requires 15 minutes. Thus, if the permit submission is done via PMIS, the total time required is 55 minutes. Below are several apartment operational activities measured using the two approaches: Manual and PMIS:

1. Daily Work Permit

System	Request Daily Work Permit (minutes)	Approve Daily Work Permit (minutes)	Send Daily Work Permit Document (minutes)
Manual	30	50	30
PMIS	15	25	15

Here are the calculations of efficiency for each process in the Daily Work Permit workflow:

a. **Request Daily Work Permit**
   Manual = 30 minutes, PMIS = 15 minutes
   Reduction = 30 − 15 = 15 minutes
   Efficiency = (15 / 30) × 100% = 50%
b. **Approve Daily Work Permit**
   Manual = 50 minutes, PMIS = 25 minutes
   Reduction = 50 − 25 = 25 minutes
   Efficiency = (25 / 50) × 100% = 50%
c. **Send Daily Work Permit Document**
   Manual = 30 minutes, PMIS = 15 minutes
   Reduction = 30 − 15 = 15 minutes
   Efficiency = (15 / 30) × 100% = 50%

Based on the calculations above, the percentage efficiency for each activity is:

- Request Daily Work Permit: 50%
- Approve Daily Work Permit: 50%
- Send Daily Work Permit Document: 50%

To calculate the total efficiency of the entire Daily Work Permit process for 38 units per month:

- Total number of daily work permits per month = 38

- Combined manual time (from the data above) = 30 + 50 + 30 = 110 minutes/unit
- Combined PMIS time = 15 + 25 + 15 = 55 minutes/unit

Therefore:

- Total manual time for 38 units = 110 × 38 = 4,130 minutes
- Total PMIS time for 38 units = 55 × 38 = 2,090 minutes
- Time saved = 4,130 – 2,090 = 2,040 minutes
- Percentage efficiency = (2,040 ÷ 4,130) × 100% ≈ 50%

Thus, the efficiency of Daily Work Permit using the PMIS compared to manual system for 38 units in one month is approximately **50%**

2. Fit-Out Request

System	Request Fit-Out (minutes)	Approve Fit-Out Document (minutes)	Approve Signed Unit Fit-Out (minutes)
Manual	30	50	50
PMIS	15	25	50

Efficiency calculations for each Fit-Out Request process:

1. **Request Fit-Out**
   Manual = 30 min, PMIS = 15 min
   Reduction = 30 − 15 = 15 min
   Efficiency = (15 / 30) × 100% = 50%
2. **Approve Fit-Out Documentation**
   (Note: you wrote “Manual = 120 min, PMIS = 50 min” - but table shows 50 min manual; assuming manual 50 min, PMIS 25 min)
   Manual = 50 min, PMIS = 25 min
   Reduction = 50 − 25 = 25 min
   Efficiency = (25 / 50) × 100% = 50%
3. **Approve Signed Unit Fit-Out**
   Manual = 50 min, PMIS = 50 min
   Reduction = 50 − 50 = 0 min
   Efficiency = (0 / 50) × 100% = 0%

Based on these calculations, the efficiency percentages by activity are:

- Request Fit-Out: 50%
- Approve Fit-Out Documentation: 50%
- Approve Signed Unit Fit-Out: 0%

If we calculate overall monthly efficiency for Fit-Out Requests using data for 15 units per month:

- Total Fit-Out Requests per month = 15
- Combined manual time per unit = 30 + 50 + 50 = 130 min/unit
- Combined PMIS time per unit = 15 + 25 + 50 = 85 min/unit

Therefore:

- Total manual time for 15 units = 130 × 15 = 1,950 minutes
- Total PMIS time for 15 units = 85 × 15 = 1,275 minutes
- Time saved = 1,950 − 1,275 = 675 minutes
- Percentage efficiency = (675 ÷ 1,950) × 100% ≈ **35%**

Therefore, the efficiency of Fit-Out Requests using the PMIS compared to manual handling - for 40 units in one month - is approximately 35%.

3. Work Order Request

System	Request Work Order (minutes)	Work Order Execution (minutes)	Work Order Reporting (minutes)
Manual	30	120	30
PMIS	10	120	10

Efficiency calculations for Work Order processes:

1. **Request Work Order**
   Manual = 30 min, PMIS = 10 min
   Reduction = 30 − 10 = 20 min
   Efficiency = (20 / 30) × 100% = 67%
2. **Work Order Execution**
   Manual = 120 min, PMIS = 120 min
   Reduction = 120 − 120 = 0 min
   Efficiency = (0 / 120) × 100% = 0%
3. **Work Order Reporting**
   Manual = 30 min, PMIS = 10 min
   Reduction = 20 min
   Efficiency = (20 / 30) × 100% = 67%

Using data for 99 units per month:

- Total Work Orders per month = 99
- Combined manual time per unit = 30 + 120 + 30 = 180 min/unit
- Combined PMIS time per unit = 10 + 120 + 10 = 140 min/unit

Thus:

- Total manual time for 99 units = 180 × 99 = 17,820 minutes
- Total PMIS time for 99 units = 140 × 99 = 13,860 minutes
- Time saved = 17,820 − 13,860 = 3,960 minutes
- Percentage efficiency = (3,960 ÷ 17,820) × 100% ≈ **22%**

Hence, the Work Order Request efficiency gain with PMIS vs manual for 99 units/month is around **22%**.

4. Overall Monthly Time Efficiency Summary

- Efficiency for 38 daily work permits/month: **50%**
- Efficiency for 15 fit-out requests/month: **35%**
- Efficiency for 99 work orders/month: **22%**

Average monthly efficiency = (50% + 35% + 22%) / 3 ≈ **32.3%**

Therefore, on average, the PMIS system achieves approximately **32.3% time-efficiency improvement per month** compared to the manual system.

RESULTS AND DISCUSSION

From previous observation, it was found the results below:

Interpretation of Main Findings

- The use of the PMIS system is significantly positively correlated with tenant satisfaction. This indicates that the features offered (tenant portal, complaint reporting, online payment) do provide a better tenant experience.
- Faster maintenance response time strongly influences satisfaction. The implementation of PMIS appears to contribute to reducing response time, potentially through automated task workflows, faster technician assignment, or real-time status monitoring.
- A decrease in the number of complaints per unit per month and a reduction in vacancy rate show that PMIS not only improves service but also supports occupancy and property operational stability - which has positive financial implications.

Relationship with Previous Literature

- Supporting studies indicate that a good property management system can improve efficiency, reduce manual errors, and improve tenant satisfaction. For example: industry-oriented sources from property-management software providers state that property management systems centralize information, automate routine tasks, and improve tenant retention.
- Research in Poland suggests that the quality of property management can affect the market value of residential units by approximately 15 - 30%.
- Therefore, the findings of this study are consistent with literature: PMIS serves as a management tool that significantly contributes to operational performance and tenant satisfaction.

Practical Implications for Apartment Managers

- Managers should consider including key PMIS features such as a tenant portal, real-time complaint reporting, maintenance dashboards, and automatic rent-payment reminders to improve tenant satisfaction and reduce response times.
- Parameters such as maintenance response time and number of complaints can be used as KPIs (Key Performance Indicators) after PMIS implementation for regular monitoring.
- The reduction in vacancy rate suggests that investment in PMIS can yield positive financial returns (e.g., reducing revenue loss from vacant units). Managers can calculate ROI (Return on Investment) for the PMIS system.

Challenges That Arise

- Although PMIS implementation shows positive results, this study identified challenges such as user resistance (from tenants or management staff), the need for training, integration of old/manual data into the new system, or adaptation of internal processes.
- For example, literature mentions that the lack of efficient vendor-management systems in apartments can hamper operations.
- Management must ensure that PMIS is not only installed but also used consistently by all stakeholders (tenants, technicians, management) so that its benefits are maximized.

SWOT Analysis of Property Management Information System (PMIS)

a. Strengths (Internal):

- PMIS adoption allows integration of rental, maintenance, tenant, and financial data into a single platform - simplifies management and decision-making.
- Operational efficiency improves: faster maintenance handling, more structured complaint reporting and transactions.
- Increased transparency for tenants: e.g., tenant portal, online payment system, better unit monitoring.
- Historical data and analytics available: enabling managers to observe trends, optimize costs and services.
- Ability to set KPIs and monitor performance in real-time or periodically (e.g., response time, vacancy rate).

b. Weaknesses (Internal):

- Significant initial cost for system procurement, staff training, and migrating data from old/manual systems.
- Learning curve or user resistance: management staff, technicians, or tenants may need time to adapt to the new system.
- Integration of old data or previous manual systems may be problematic, and legacy data quality may be poor/fragmented.
- If the system is not customized to the apartment's needs (unit types, service types, organizational culture), available features may not be optimal.
- Dependence on technology: system failures, data security issues, and application maintenance could become additional burdens.

c. Opportunities (External):

- The increasing trend of property and facility management digitalization - opportunity to differentiate services and increase property value.
- Availability of supporting technologies such as IoT (unit sensors, building condition monitoring), big-data analytics, AI/predictive maintenance - which can be combined with PMIS for greater added value.
- Growing tenant demand for digital services: tenant portals, mobile services, online reporting - PMIS can be a differentiating feature.
- Regulations or facility-management standards may push for formalized systems - opportunity to stay ahead.
- Potential collaboration with vendors, technology providers, or integration with smart-building systems to expand services.

d. Threats (External):

- Changing regulations or stricter data security/privacy standards (e.g., personal data protection) - if the system does not comply, it may pose legal/operational risk.
- Competition with other apartments that already have more advanced digital systems or services - need to continuously innovate.
- Rapid technological changes: the PMIS chosen today could quickly become obsolete or incompatible with future modules.
- Resistance from tenants or staff preferring traditional/manual services - may slow down adoption.
- Technology disruptions: downtime, system maintenance, cybersecurity issues could damage reputation and service quality.

Strategies based on the SWOT matrix:

- **SO (Strengths–Opportunities):** Use internal strengths such as data integration and transparency to seize opportunities for digital service differentiation and IoT integration.
- **WO (Weaknesses – Opportunities):** Overcome internal weaknesses (training, data migration) by leveraging vendor training programs or technology collaborations to capture the market for digital property management.
- **ST (Strengths–Threats):** Use PMIS strengths to build competitive advantage - e.g. superior tenant services - to mitigate threats like competition and rapid technology change.
- **WT (Weaknesses–Threats):** Identify weaknesses most vulnerable to threats (e.g. data security, user resistance), then develop mitigation plans: data backup, staff training, periodic vendor evaluation.

CONCLUSION

The use of PMIS has been proven to enhance operational efficiency in property management. The system automates administrative processes such as tenant registration, rent payment, maintenance reporting, and technician work flows - processes which traditionally require considerable time and effort. PMIS supports greater transparency and better data access: tenant data, maintenance history, unit status, and financials can be accessed in a centralized and real-time manner, enabling faster and more relevant decision making. The use of PMIS contributes to increased tenant satisfaction and reduction in the number of complaints as well as maintenance response time - this positively affects resident experience and facility management operations.PMIS also has the potential to lower unit vacancy rates and strengthen the stability of rental income because of better management and more satisfied tenants. Nevertheless, PMIS implementation is not without challenges: it requires initial investment, user training, migration of old data, and internal process adaptation so that the system can deliver its full benefits.

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