At Tadbir: Islamic Education Management Journal
Vol. 4, No. 2 November 2026. pp. 411-425
E-ISSN: 3021-8098
DOI: https://doi.org/10.54437/attadbir.v4i2.3954

Integrated Maintenance-Based Management of Boarding School Facilities at Islamic Boarding Schools

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Received: 22-10-2026	Revised: 09-11-2026	Accepted: 10-11-2026	Published: 11-11-2026

Abstract. The management of boarding school facilities requires a maintenance mechanism that links the monitoring of facility conditions to decision-making and follow-up repairs. This study aims to analyze the integration of facility management functions through daily maintenance at the API ASRI 2 Islamic Boarding School in Bandongan, Magelang. The study employs a qualitative approach using a case study design. Data were collected through in-depth interviews with 13 informants, observations, and documentation, and were then analyzed using the Miles, Huberman, and Saldaña interactive model through data condensation, data presentation, and the drawing and verification of conclusions. The research findings reveal three key mechanisms of integrated maintenance. Firstly, specialisation of management by facility type establishes control through scheduled inspections and damage reporting. Secondly, daily monitoring links stocktaking, planning, procurement, damage management and evaluation in maintenance decision-making. Thirdly, coordination with technical experts ensures that damage management requiring specialised expertise remains under the control of management, whilst also providing opportunities for technical skills development through mentoring. This study concludes that integrated maintenance is formed through the interconnection of responsibilities, information on facility conditions, technical coordination, and continuous evaluation. The conceptual contribution of this study lies in its explanation of the integration of structural, operational, and collaborative dimensions in the management of boarding school facilities.

Keywords: Facilities Management; Integrated Maintenance; Islamic Boarding School Dormitories; Specialized Administration; Technical Collaboration.

Abstrak. *Pengelolaan sarana prasarana asrama pesantren memerlukan mekanisme pemeliharaan yang menghubungkan pemantauan kondisi fasilitas dengan pengambilan keputusan dan tindak lanjut perbaikan. Penelitian ini bertujuan menganalisis keterpaduan fungsi manajemen sarana prasarana melalui pemeliharaan harian di Pondok Pesantren API ASRI 2 Bandongan, Magelang. Penelitian menggunakan pendekatan kualitatif dengan jenis studi kasus. Data dikumpulkan melalui wawancara mendalam terhadap 13 informan, observasi, dan dokumentasi, kemudian dianalisis menggunakan model interaktif Miles, Huberman, dan Saldaña melalui kondensasi data, penyajian data, serta penarikan dan verifikasi kesimpulan. Hasil penelitian mengungkap tiga mekanisme utama pemeliharaan terpadu. Pertama, spesialisasi kepengurusan berdasarkan jenis fasilitas membentuk pengendalian melalui pemeriksaan terjadwal dan pelaporan kerusakan. Kedua, pemantauan harian menghubungkan inventarisasi, perencanaan, pengadaan, penanganan kerusakan, dan evaluasi dalam pengambilan keputusan pemeliharaan. Ketiga, koordinasi dengan tenaga ahli memungkinkan penanganan kerusakan yang memerlukan kompetensi khusus tetap berada dalam pengendalian pengurus, sekaligus membuka kesempatan pembelajaran keterampilan*

teknis melalui pendampingan. Penelitian ini menyimpulkan bahwa pemeliharaan terpadu terbentuk melalui keterhubungan tanggung jawab, informasi kondisi fasilitas, koordinasi teknis, dan evaluasi berkelanjutan. Kontribusi konseptual penelitian terletak pada penjelasan integrasi dimensi struktural, operasional, dan kolaboratif dalam pengelolaan fasilitas asrama pesantren.

Kata Kunci: *Manajemen Sarana Prasarana; Pemeliharaan Terpadu; Asrama Pesantren; Spesialisasi Kepengurusan; Kolaborasi Teknis.*

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INTRODUCTION

The management of facilities and infrastructure is an important part of the governance of Islamic boarding schools, as the continuity of education depends not only on teaching and learning, but also on the suitability of the students' accommodation (Fauzi, 2022; Suryana, 2020). Unlike formal learning spaces, the dormitory is used 24 hours a day to support rest, worship, independent study and social interaction (Musolin, 2019; Tahang, 2023). The intensity of such use requires that facility management be focused not only on the availability of facilities, but also on monitoring their condition and ensuring their continued functionality. Infrastructure management encompasses planning, procurement, inventory management, use, maintenance, supervision and decommissioning (Amalia dkk., 2025; Mukhlis dkk., 2022). However, the nature of student halls of residence requires particular attention to be paid to monitoring the condition of the facilities, the allocation of responsibilities, and the handling of damage. Consequently, the key issue in the management of student hall of residence facilities and infrastructure concerns not only the adequacy of the facilities, but also the regularity of maintenance procedures that ensure their continued usability.

However, the nature of student halls of residence requires particular attention to be paid to monitoring the condition of the facilities, the allocation of responsibilities, and the handling of damage. Consequently, the key issue in the management of student hall of residence facilities and infrastructure concerns not only the adequacy of the facilities, but also the regularity of maintenance procedures that ensure their continued usability (Sebayang dkk., 2023). Meanwhile, Mumtaz identified the maintenance of boarding school facilities through ongoing, regular and emergency activities; however, supervision has not yet been extended to all facilities equally (Mumtaz dkk., 2025). These findings highlight different issues, but both underscore the importance of paying attention to the condition and management of pesantren facilities. In a boarding environment that is subject to intensive use, limited supervision has the potential to hinder the identification and rectification of damage. Therefore, a study is required that not only identifies forms of maintenance, but also explains how information on the condition of facilities is managed to form the basis for decision-making and remedial action.

Research into the management of educational facilities and infrastructure has evolved through several areas of focus. Research (Ginanjar dkk., 2023; Hamidah dkk., 2025) discusses the implementation of facility management functions, including planning, procurement, organisation or inventory management, utilisation, maintenance and disposal, in support of the delivery of

education. Meanwhile, (Khair, 2025) highlights strategies for the maintenance of Islamic boarding school facilities, whilst (Sebayang dkk., 2023) examine the management of facilities and infrastructure from the perspective of students' satisfaction. These studies provide an understanding of management functions, maintenance practices, supervision and the quality of service provided by educational facilities. However, the interrelationship between monitoring activities, the coordination of damage repairs and evaluation in the management of boarding school facilities has not yet been a primary focus of these studies.

This gap highlights the need for a study into the interconnections between maintenance processes, rather than merely carrying out each management function in isolation. Indeed, routine inspections require a clear system of reporting and follow-up, whilst the division of responsibilities must be supported by technical coordination and an evaluation of the results of any improvements (Asri dkk., 2026). Preventative maintenance to reduce the risk of breakdowns and corrective maintenance to deal with faults need to be linked through record-keeping, coordination and evaluation (Wijono & Riyadi, 2023). In this study, integrated maintenance is understood as a mechanism that links the organisation of responsibilities, planning and procurement, stock-taking, day-to-day monitoring, the handling of faults and decommissioning, as well as evaluation and follow-up. This definition is used as an analytical framework to examine how information and decisions link the various activities involved in the management of student accommodation facilities.

The API ASRI 2 Islamic Boarding School in Bandongan, Magelang Regency, provides a relevant context for examining this mechanism. Previously, facility management was carried out centrally with a general division of tasks, whilst inspections tended to be periodic or carried out only after reports of damage had been received. The boarding school subsequently developed a maintenance system through the allocation of responsibilities based on the type of facility, covering water, electricity, lighting, cleaning, as well as equipment and inventory. Each department carries out monitoring and reporting on the condition of the facilities, whilst damage requiring specialist expertise is coordinated with technical staff. The results of this monitoring and subsequent repairs then form the basis for an evaluation of management practices. These characteristics provide an empirical context for examining the relationship between the management structure, the implementation of maintenance, and decision-making. Consequently, the research location was selected not merely because it carried out maintenance activities, but because it provided a case study that allowed for an in-depth analysis of the interconnections between the various components of boarding school infrastructure management.

In light of this research gap, this study focuses on the integration of maintenance processes within the management of boarding school facilities. Unlike previous studies, which placed greater emphasis on management functions, forms of maintenance and the quality of facility services, this study focuses on the interconnection between the organisation of management staff, planning and procurement, inventory management and daily maintenance, the handling of damage and the decommissioning of facilities, as well as evaluation and follow-up on management. Based on these research issues and gaps, this study aims to analyse how daily maintenance links the management functions of student accommodation facilities through the specialisation of responsibilities, monitoring of facility conditions, maintenance decision-making, technical coordination, and continuous evaluation. This study is expected to make a conceptual contribution by explaining the integration of structural, operational and collaborative dimensions in the maintenance of boarding school facilities, whilst also providing practical implications for the development of organised and sustainable governance of boarding school infrastructure.

METHODS

This study employs a qualitative approach using a case study design to analyse the mechanisms of integrated maintenance in the management of boarding school facilities and infrastructure (Yin, 2017). The unit of analysis for this research is the interconnection of processes involved in the management of boarding facilities, including the division of responsibilities, monitoring of facility conditions, decision-making, coordination of damage repairs, and evaluation. The research was conducted at the API ASRI 2 Bandongan Islamic Boarding School, Salamkanci Village, Bandongan Sub-district, Magelang Regency. This location was chosen because its boarding house facility management involves the division of responsibilities based on facility type, daily inspections, coordination of damage repairs, and multi-tiered evaluation. Furthermore, all students are required to live in the boarding house, meaning the facilities are used intensively in daily activities. Data collection took place from January to July 2026, comprising field observations from January to April, as well as in-depth interviews and a review of documentation from May to July 2026.

The research data were obtained through in-depth interviews, observation and a review of documentation. The interviews involved 13 informants, comprising one boarding school head, two general advisers, five members of the boarding school's facilities and infrastructure management team, and five students. These informants represented the parties involved in policy-making, the implementation of maintenance, and the use of boarding house facilities. Observations were made regarding the condition of the facilities, the conduct of daily inspections, and the coordination of damage repairs between the management and the boarding house staff. Documentation included the management structure, inventory books, damage reports, daily cash books, duty rosters, and minutes of evaluation meetings. Data from these three methods were used to trace the processes of planning and procurement, inventory and maintenance, damage management and disposal, as well as the evaluation and follow-up of facility management.

The validity of the data was verified through source triangulation by comparing the statements of the head of the boarding school, the general adviser, the facilities and infrastructure manager, and the students (Nurfajriani dkk., 2024). Information regarding the division of responsibilities, the carrying out of maintenance, and the follow-up on damage was confirmed through the perspectives of different informants. Technical triangulation was carried out by cross-referencing interview accounts with the results of observations and available documents, particularly in relation to the division of tasks, the condition of facilities, the recording of damage, the procurement of supplies, and the follow-up on repairs.

Data analysis using interactive models (Miles dkk., 2018), which encompasses data condensation, data presentation, and the drawing and verification of conclusions. Data condensation was carried out by selecting and grouping information into six analytical themes, namely the organisation of infrastructure, planning and procurement, inventory and maintenance, damage management and disposal, evaluation and follow-up, and collaboration between administrators and experts. Data on planning, procurement, inventory and disposal were also analysed to illustrate their relationship with the maintenance process. Subsequently, the data were presented in narrative form and tables to identify the relationships between the various components of management. Conclusions were drawn by interpreting the relationships between themes to explain how day-to-day maintenance links the functions of infrastructure management. The results of this interpretation were then cross-checked against data from interviews,

observations and documentation to ensure consistency between the identified patterns and the empirical evidence.

RESEARCH FINDINGS AND DISCUSSION

Results

Organisation and Management of Dormitory Facilities and Infrastructure

This study found that the organisation of boarding facilities at the API ASRI 2 Bandongan Islamic Boarding School has shifted from a macro-administrative system to a micro-administrative one through the specialisation of responsibilities based on the type of facility. The shift from a macro-administrative to a micro-administrative system not only divided management—which was originally centralised in a single department into five areas, but also changed the facility supervision mechanism from periodic inspections to daily monitoring based on the type of infrastructure. The five areas comprise water supply (A), electricity (B), lighting (C), cleaning (D), and facilities and inventory (E). This division assigns each area responsibility for inspecting, recording and reporting on the condition of the facilities, thereby enabling maintenance needs to be identified through more specific areas of responsibility. This finding is supported by a statement from Fajar Aji Pamungkas, the head of the boarding school, who said:

> *"Previously, all matters relating to infrastructure were handled by a single department. However, management is now divided into five areas: water, electricity, street lighting, cleaning, and facilities and inventory."*

A comparison of the two systems shows that changes in management were accompanied by adjustments to inventory recording, the handling of damage based on urgency, and the implementation of a tiered evaluation process. The differences in these management mechanisms are set out in Table 1.

Table 1. Comparison of Macro-Administrative and Micro-Administrative Management

Aspect	Previous System (Macro-Administrative)	System at the Time of the Study (Micro-Administrative)
Structure	One department is responsible for all the halls of residence.	Five specific areas (A–E), each with its own person in charge.
Division of tasks	Facility management is carried out on a general basis.	Responsibilities are categorised according to the type of facility.
Examination	On a regular basis or following a report of damage.	Daily, in accordance with the schedule for each department.
Recording	A summary of the general condition of the facilities.	Recording of coded stock and damage reports.
Dealing with damage	Awaiting coordination or a meeting of the executive committee.	Action will be taken based on the urgency and extent of the damage.
Evaluation	Carried out through regular meetings.	Carried out on a daily, weekly, monthly and annual basis.

This comparison shows that changes to the management structure are not limited to the division of tasks, but also encompass mechanisms for inspecting and reporting on the condition of facilities. Under the previous system, facility management was generally carried out through periodic inspections, whilst the micro-administrative system assigns daily monitoring as the responsibility of each respective department. The results of these inspections then serve as the basis for record-keeping, reporting and the coordination of damage repairs. This pattern

demonstrates that specialisation in management is not merely a division of administrative tasks, but forms the basis for the organisation of maintenance, linking the monitoring of facility conditions to the follow-up process.

Planning and Procurement of Dormitory Facilities and Infrastructure

This study identified a planning approach based on the actual condition of the facilities, as recorded in daily inspection reports. Reports of damage and shortages of equipment from each department form the basis for submitting requests, which are then decided upon through consultation based on urgency and budget availability. Fajar Aji Pamungkas, the head of the boarding school, explained:

> *"Each sector submits its requirements based on the conditions observed on the ground. These proposals are then discussed in a consultation process to determine which facilities should be prioritised in accordance with the level of need and the availability of funds."*

This mechanism demonstrates that the results of facility monitoring form the basis for planning decisions.

Further findings reveal a procurement pattern based on urgency and funding capacity. Daily procurement is directed towards minor repairs, monthly procurement covers routine needs, whilst incidental procurement is for urgent requirements or large-scale repairs. Funding comes from students' fees, the boarding school's funds, donations and external aid, with an allocation of Rp5,000 per student and a routine budget of around Rp1,000,000 per month for equipment and minor repairs. Miftahul Muis, the administrator responsible for facilities and inventory, explained:

> *"If the available funds are insufficient, urgent needs such as bathrooms and electrical installations will be prioritised, whilst other facilities can be provided in stages."*

These findings indicate a link between monitoring the condition of facilities, submitting requests, setting priorities and carrying out procurement. This pattern suggests that planning and procurement are not separate administrative activities, but are linked to the day-to-day maintenance needs of the halls of residence.

Inventory and Maintenance of Dormitory Facilities and Infrastructure

The inventory of dormitory facilities is carried out by recording the identity, location, condition and changes in the status of the facilities. The inventory does not stop at simply recording the quantity of items, but also covers the identity, location, condition and changes in the status of facilities resulting from relocation or repairs. The use of inventory codes, such as JNS-03-MJ-05 for table number 05 in room 03 of the Jenius Hall of Residence, enables the management to trace specific facilities. This recording method demonstrates that the inventory provides information on the condition of items, which can be used to identify maintenance needs.

Further findings reveal that daily inspections are not carried out uniformly, but are tailored to the characteristics of the facilities and their hours of use. Water systems are inspected in the morning and evening, whilst lighting is checked in the late afternoon. Meanwhile, electrical systems, cleanliness, and facilities and inventory have their own inspection schedules. These differences in timing indicate a pattern of scheduled maintenance based on the function of the facilities. These activities are further reinforced by a weekly round every Friday as part of the maintenance of the dormitory's environmental cleanliness. Details of the time allocation and items inspected are presented in Table 2.

Table 2. Daily Inspection Schedule for Dormitory Facilities and Infrastructure

Field	Time of Examination	Focus of the Examination
Waters (A)	05.30-06.30 and 15.30-16.30	Availability of water and sanitation facilities
Electrical Engineering (B)	06.30-07.30	Electrical installations and equipment
Lighting (C)	17.00-17.45	The function of lamps and lighting
Hygiene (D)	06.00–07.00	Cleanliness of rooms and the hall of residence
Equipment and Inventory (E)	13.30–14.30	Condition of facilities and inventory data

The interconnection between these two activities is evident in the mechanism for recording the condition of facilities. Daily inspections are used to identify damage, whilst inventory information helps to identify items and locations requiring attention. Damage reports include the time, location, item code, type of damage and the necessary follow-up action. The interconnection between these two activities forms an information-based maintenance mechanism, with the recording of damage acting as the link between problem identification and decisions on how to address them.

Handling Damage to and Removal of Dormitory Facilities and Infrastructure

This study found a tiered system for handling damage, which differentiates the responsibilities of the boarding house management based on technical ability and the severity of the damage to the facilities. The management does not handle all damage independently, but acts as inspectors, record-keepers and carries out minor repairs, whilst work requiring specialist expertise is delegated to qualified professionals. The head of the boarding house explained,

> *"The boarding house managers are responsible for carrying out checks, identifying damage, recording reports and carrying out minor repairs. Meanwhile, if the damage requires specialised expertise, such as repairs to electrical installations, main pipes or welding beds, the boarding house will seek assistance from more skilled workers."*

This division of responsibilities demonstrates that decisions on how to handle issues are not determined solely by the area of management responsibility, but also by the technical capabilities of the staff.

Efforts are made to resolve minor damage on the same day, whilst the handling of complex damage is tailored to the requirements of the work and the availability of specialist staff. The management remains involved in recording requirements and inspecting the results of repairs. Efforts are made to resolve minor damage on the same day, whilst complex repairs are adapted to technical requirements and the availability of specialist staff. This approach demonstrates a separation between the responsibility for overseeing maintenance and the execution of technical work, without severing the management's involvement in the damage-handling process.

Decisions regarding facilities unfit for use reflect a management approach based on the condition and potential for re-utilisation of the assets. Facilities that cannot be repaired are removed from the inventory and then sorted for disposal, sale as second-hand goods, or re-utilisation of their components. Proceeds from sales are allocated to the maintenance fund. These findings

indicate that decisions on disposal do not always result in the discarding of assets, but take into account the possibility of reuse and their economic value. These findings show that follow-up actions regarding damage encompass three possible decisions: in-house repairs, handling by specialists, and disposal based on the asset's suitability. Disposal also takes into account the potential for reuse and the economic value of any remaining components.

Evaluation and Follow-up on the Management of Dormitory Facilities and Infrastructure

This study found that maintenance evaluations are carried out in stages through daily, weekly, monthly and annual activities. Daily evaluations are used to identify faults requiring immediate attention, weekly evaluations to coordinate cross-departmental issues, whilst monthly evaluations form the basis for reviewing the condition of facilities, budget utilisation and the determination of future requirements. Annual assessments focus on management accountability, stocktaking and budget planning. These differing functions demonstrate that assessments are not merely reporting exercises, but also control mechanisms based on the level of need and the timeframe for resolution.



Figure 1. Evaluation of the Management of Dormitory Facilities and Infrastructure

Other findings indicate that the results of the evaluation are used as input for subsequent maintenance planning. Reports from the management and feedback from the students are taken into account when determining priorities for repairs and procurement. The head of the boarding school explained, *"The evaluation results are then used to determine the priorities for infrastructure needs in the following month."* This statement indicates that the evaluation does not stop at reviewing the implementation of activities, but generates information that is used to adjust maintenance needs and priorities. Thus, the evaluation links the implementation of maintenance with ongoing planning on a regular basis.

Collaboration between the Hall of Residence Management and the Hall of Residence Staff

This study identified a pattern of technical collaboration in which the management acts as the controller of the maintenance process, whilst tasks requiring specialised expertise are carried out by specialists. Although the most demanding tasks are delegated to specialists, the management retains control of the process through the identification of damage, centralised coordination, securing the site, supervising the work, and inspecting the results of repairs. The facilities and inventory department (E) acts as the main liaison to ensure that damage management is not handled in isolation across different departments. Miftahul Muis explained, *"If there is serious damage, the*

department managers report to me first; they do not contact the tradespeople individually. I note down the code, the location and the nature of the damage, and only then do I contact the tradespeople." This approach demonstrates that the involvement of specialist tradespeople forms part of a maintenance control system that remains coordinated by the hall of residence management.

Other findings reveal that supervising the work serves a dual purpose: maintaining order within the hostel environment whilst also serving as a means of learning technical skills. The managers not only supervise the work to ensure safety and proper execution but also gain first-hand experience in dealing with damage. Yusuf Sabab Alwi stated, *"At first, I could only change a light bulb. But because I often accompanied the electrician whilst he worked, I can now replace sockets and switches myself."* This experience demonstrates the acquisition of skills through direct involvement in repair activities. However, this evidence reflects the experience of a specific informant and does not yet indicate an improvement in the competence of all committee members. Thus, the distinctive nature of the collaboration identified lies in the integration of technical work supervision and the practical learning of committee members in dormitory facility maintenance activities.

Overall, the research findings reveal interconnections between management specialisation, facility condition monitoring, planning and procurement decisions, inventory management, damage handling, technical coordination, and evaluation. Management specialisation through a micro-administrative system forms the basis for the division of responsibilities regarding facility inspections, whilst the results of daily monitoring are used to inform planning, procurement, and the identification of repair needs. Inventory management supports the identification of the condition of items, whilst damage management is carried out based on urgency and technical capability through coordination between management and technical experts. A tiered evaluation process then links the results of maintenance implementation to the prioritisation of future needs. This sequence demonstrates that integrated maintenance is formed through the interconnection of management processes, rather than merely the separate execution of individual management functions.

Discussion

Specialisation in Management as the Basis for Controlling Hostel Maintenance

The shift in the management system from macro-administrative to micro-administrative indicates that the specialisation of responsibilities serves as the basis for maintenance control when accompanied by mechanisms for inspection, reporting and coordination amongst managers. The division of tasks by facility type enables targeted inspections, whilst record-keeping and reporting link monitoring results to follow-up actions regarding damage. From Mintzberg's perspective, organisational effectiveness is determined not only by the division of labour, but also by coordination mechanisms that integrate activities across departments (Mintzberg, 1979). The findings of this study demonstrate this relationship through the interconnection between those responsible for the facilities, scheduled inspections, condition reporting and the coordination of damage repair. Therefore, maintenance control is not solely established through the specialisation of tasks, but through the interconnection of work processes that enable the condition of facilities to be monitored and addressed in an organised manner (Suranto dkk., 2022).

These findings complement the study (Ansori dkk., 2025; Ginanjar dkk., 2023) regarding the management of educational facilities and infrastructure, as well as (Cahyani dkk., 2024; Sebayang dkk., 2023) which highlights the perspective of users of Islamic boarding school facilities. In contrast to that focus, this study examines the operational relationship between the division of responsibilities, the monitoring of facility conditions, and the coordination of follow-up maintenance. That study provides a foundation for understanding the importance of educational

facility management, but its focus differs from the maintenance control mechanisms identified in this study. If (Ginanjar dkk., 2023) incorporating management functions as part of the running of educational facilities and (Sebayang dkk., 2023) By highlighting users' assessments of its management, this study clarifies the operational relationship between management specialisation, monitoring of facility conditions, and coordination of follow-up actions. Consequently, this study not only emphasises the importance of organising infrastructure, but also broadens our understanding of how the division of responsibilities at management level can be linked to the control of day-to-day maintenance.

Specialisation in governance does not in itself guarantee integrated management, as the separation of responsibilities has the potential to lead to fragmentation if not accompanied by adequate coordination (Aziz dkk., 2024; Bunda, 2024). In the context of this study, reporting and coordination mechanisms act as a link between departments, ensuring that information regarding the condition of facilities does not remain solely with the respective persons in charge, but can be used to determine follow-up maintenance actions. This demonstrates that the primary contribution of micro-administrative organisation is not merely to clarify the division of tasks, but to establish control mechanisms based on specialisation and coordination. These findings position organisation as the structural foundation of integrated maintenance, namely when different responsibilities are linked through inspection, reporting and maintenance decision-making (Ritonga, 2026). Consequently, the integrated management of boarding house facilities is best understood as interconnection between functions rather than the standardisation of the management committee's duties.

Integration of Management Functions through Daily Maintenance

In this study, daily maintenance serves as a source of operational information that links the actual condition of facilities to decisions regarding planning, procurement, fault rectification and evaluation. Facility inspections are not only aimed at identifying faults, but also at generating information on the condition of assets, which is used in needs planning, setting procurement priorities and repair decisions. Inventory records help to identify facilities requiring attention, whilst a tiered evaluation links the results of maintenance implementation to planning for the next period. This pattern can be understood through a management functions perspective, which treats planning, organising, executing and controlling as interrelated processes. (Terry, 1977). In this context, daily maintenance is not merely an operational activity, but serves as a source of information that links decision-making to the actual condition of the facilities. Consequently, integrated management is achieved through the continuous use of maintenance information, rather than simply through the performance of individual management functions.

These findings broaden the discussion on the management of educational facilities and infrastructure, which has hitherto focused largely on the implementation of management functions and their contribution to educational services. Ridwanulloh et al., for example, examined the role of facilities and infrastructure management in improving the quality of the learning process (Ridwanulloh dkk., 2023). Whereas (Sebayang dkk., 2023) examining students' satisfaction with the management of boarding school facilities. In contrast to this focus, this study highlights the operational relationship between information on the condition of facilities and managerial decisions. Daily inspections serve as the starting point for identifying needs; stock-taking supports the monitoring of asset condition; damage repair takes into account urgency and technical capability; whilst evaluation provides feedback for setting future priorities. This relationship is also relevant to the concepts of preventive and corrective maintenance, namely efforts to maintain the condition of facilities through inspections and planned maintenance activities, as well as addressing

issues when damage occurs (Latif dkk., 2025; Rasminto dkk., 2025). However, the findings of this study not only reveal the existence of these two forms of maintenance, but also their relationship with the planning, procurement and evaluation processes in the management of boarding facilities.

The integration of management functions does not imply a fixed sequence of tasks, but rather a network of decisions tailored to the urgency of the damage and the availability of resources. Urgent damage may require immediate action, whilst non-urgent requirements are addressed through consultation and budgetary adjustments. This demonstrates that integrated maintenance is responsive to information from the field whilst taking resource constraints into account (Rangkuti, 2021; Rhamdani dkk., 2024). A tiered evaluation is a crucial component as it enables the results of inspections and damage repairs to be reused in determining future maintenance requirements. Thus, the conceptual contribution of this research lies in its explanation of daily maintenance as a mechanism linking management functions, operating through the flow of information on facility conditions, prioritisation, implementation of follow-up actions, and evaluation. This framework broadens the understanding of dormitory infrastructure management from merely the execution of administrative functions towards an interconnected management process oriented towards the sustainability of facility maintenance.

Technical Collaboration and Capacity Building for Management Staff in the Maintenance of Student Halls of Residence

Collaboration between management and technical experts demonstrates a division of roles between managerial control and technical implementation, with a single point of coordination acting as the link between the two. Management remains responsible for identifying needs, reporting, scheduling work, providing guidance, and inspecting the results of repairs, whilst technical experts are involved when damage requires specialist expertise. This model demonstrates that the use of external personnel does not eliminate the function of internal control, but positions management as the link between maintenance requirements and the implementation of repairs (Amin dkk., 2025; Yundiafi dkk., 2025). From the perspective of organisational coordination theory, Malone and Crowston explain that coordination relates to the management of interdependencies between activities (Malone & Crowston, 1994). The findings of this study reflect this principle through a one-stop coordination mechanism that links damage reports, the appointment of maintenance staff, the organisation of work, and the inspection of results. Consequently, technical collaboration can be understood as a mechanism for managing the interdependence between the administrators' authority and the workers' expertise in ensuring the regular maintenance of the hall of residence facilities.

These findings complement a study on the management of educational infrastructure which emphasises the importance of carrying out maintenance activities to support the continuity of educational services, as discussed by (Ginanjar dkk., 2023; Subhan dkk., 2025). Whilst the management of public facilities is generally examined through a series of management functions, this study provides a more specific explanation of how the limitations in the technical capabilities of facility managers are addressed through collaboration with experts, without relinquishing supervisory responsibility. Furthermore, the experience of facility managers who acquired skills through on-the-job mentoring demonstrates the presence of a learning dimension within maintenance activities. These findings are relevant to Kolb's theory of experiential learning, which positions experience as part of the process of knowledge and skill formation through reflection and application (Kolb, 1984). Although this study did not assess all the stages of learning as outlined by Kolb, the mentoring experiences reported by the informants suggest that direct involvement in

technical work can provide an opportunity for managers to develop practical skills within the limits of their competence.

Collaboration with experts should not be interpreted as a transfer of all maintenance responsibilities to an external party. Integrated management, in fact, depends on clarity of authority, coordination of work, and the management's inspection of repair results. Similarly, skills development through mentoring does not mean that all technical work can be delegated to the management, particularly in the case of damage requiring specialised expertise and specific safety standards. Based on these findings, the contribution of this research lies in the identification of two functions of collaboration in dormitory maintenance: as a mechanism for coordinating the handling of damage and as an opportunity for the caretakers to learn skills. These two functions broaden the understanding of integrated maintenance by demonstrating that the interconnectedness of management extends not only across administrative functions but also between internal controls, external expert support, and the capacity development of maintenance personnel.

A synthesis of the three findings indicates that integrated maintenance can be understood through three interrelated dimensions: structural, operational and collaborative. The structural dimension determines the division of responsibilities; the operational dimension links information on the condition of facilities to maintenance decisions; whilst the collaborative dimension governs the involvement of experts in addressing faults. Specialisation within the management team provides clarity of responsibility; daily inspections provide information for maintenance decision-making; whilst coordination with experts enables fault resolution to be tailored to the needs and technical capabilities of the management team. These interconnections are reinforced through evaluations that link maintenance implementation to the setting of subsequent priorities. Thus, this study makes a conceptual contribution by demonstrating that integrated maintenance within a pesantren environment is not determined solely by the separate execution of management functions, but by the coordination mechanisms, information flows, and follow-up actions that link these functions. This perspective positions the maintenance of boarding school facilities as an interrelated managerial process, whilst taking into account the organisational characteristics and resource constraints of the pesantren.

CONCLUSION

This study concludes that the integrated maintenance of dormitory infrastructure is achieved through the interconnection of management responsibilities, information on the condition of facilities, maintenance decision-making, technical coordination and ongoing evaluation. Specialisation within the management team clarifies maintenance responsibilities, whilst daily inspections provide information that links the identification of needs to decisions on repairs and procurement. Collaboration with experts ensures that tasks requiring specialised skills remain under the management team's coordination and supervision, whilst also providing opportunities for skills development through mentoring. Multi-tiered evaluation links maintenance implementation to the prioritisation of future needs. These findings confirm that integrated maintenance is determined not only by the execution of individual management functions, but primarily by the interconnection of information, coordination and follow-up in the management of dormitory facilities.

The conceptual contribution of this research is an explanation of the integration of structural, operational and collaborative dimensions as a mechanism linking organisation, maintenance implementation and technical expertise support in boarding school facility management. In practical terms, boarding school facility management requires clear division of responsibilities, scheduled inspections, follow-up on reports, and technical coordination appropriate to the level of

damage. This study is limited to a single Islamic boarding school case and has not yet evaluated the impact of integrated maintenance on cost efficiency, the frequency of damage, or the service life of the facilities. Further research is recommended to involve several Islamic boarding schools with different characteristics and to measure changes in maintenance performance to test the application of this mechanism in a broader context.

Statement on the Use of Artificial Intelligence (AI)

Artificial intelligence tools supported the linguistic preparation of this article by suggesting clearer phrasing, grammatical corrections, and improvements to textual coherence. The authors evaluated these suggestions and made the final editorial decisions. AI was not involved in collecting or analysing research data, interpreting the evidence, or establishing the conclusions. The authors remain accountable for all content presented in the article.

Author Contribution Statement

Ismail Asyadzili formulated the research questions, organised the investigation, conducted data collection and analysis, and wrote the initial manuscript. Dahlia contributed to the research design, examined the interpretation of the findings, and revised the discussion. Muhammad Amin reviewed the theoretical foundations, assessed the coherence of the arguments, and contributed to substantive manuscript revision. All authors approved the final version for publication and agreed to address any questions concerning the accuracy or integrity of the work.

Funding Statement

The study was financed through the authors' personal resources, without support from external grants or sponsorship arrangements. This funding arrangement also covered the preparation of the manuscript.

Conflict of Interest Statement

The authors have no financial ties, institutional obligations, or personal affiliations to disclose that would create a conflict of interest in relation to this study and its publication.

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