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Design of a Trello-Based Application Monitoring System for PT XYZ

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Abstract

The internship program through the Merdeka Belajar Kampus Merdeka (MBKM) policy provides students with opportunities to gain professional experience through direct involvement in an industrial environment. This study aims to analyze the existing mechanism for monitoring work requests and design a digital-based improvement monitoring system using Trello in the Internal Audit Department, particularly within the Document Control & System Integration section of PT XYZ, a manufacturing company that produces paints, coatings, adhesives, thinners, and supporting chemicals. The study employs a non-empirical approach through Information Engineering and System Design & Engineering, consisting of system condition identification, stakeholder identification, problem analysis, requirement formulation, and system design. The analysis was conducted using a Rich Picture, while functional requirements and process flows were modeled using Use Case Diagrams and Activity Diagrams involving the User, TMIS, and Document Control & System Integration. The design results indicate that the previous monitoring mechanism was still manual and fragmented, limiting work-status transparency, delaying information updates, and increasing dependence on physical documents. The proposed system represents each request as a card on a Trello board that can be moved through the Screening, Presented, and Implementation stages and equipped with progress information, comments, and completion evidence. This design provides a more structured, transparent, and integrated monitoring mechanism to support cross-divisional coordination and the digitalization of work processes at PT XYZ.

Keywords: *Digitalization, Document Control, Manufacturing, Monitoring System, Trello.*

INTRODUCTION

Program Merdeka Belajar Kampus Merdeka (MBKM) represents a major policy initiative of the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia that expands students' opportunities to obtain learning experiences beyond conventional campus environments and to develop competencies aligned with contemporary industrial and workplace requirements (Apoko et al., 2022). The growing interaction between higher education and industry also reflects a broader transformation in which organizational activities increasingly depend on digital systems to coordinate information, tasks, and knowledge across organizational boundaries. Contemporary digital project management has emerged in response to rapidly changing work environments, where distributed information, dynamic task structures, and accelerated decision-making require organizations to replace fragmented administrative practices with more adaptive digital mechanisms (Wu, 2022). Project management tools have consequently become important instruments for organizing tasks, tracking activities, allocating responsibilities, and facilitating communication among individuals involved in a project or work process (Agrawal et al., 2023). The development of digital project management has also encouraged organizations to reconsider conventional monitoring practices because visibility of task progress increasingly determines the ability of managers and team members to identify delays, coordinate dependencies, and respond to changing requirements. In this context, task and project monitoring should not be understood merely as a mechanism for recording completed activities, but as an information-management process that connects requests, responsibilities, progress, and completion within a coherent operational workflow.

Previous studies indicate that digital task management can provide tangible benefits when information concerning activities and responsibilities is organized within an integrated platform rather

than dispersed across separate communication media. Clemente and Domingues (2023) demonstrate that project management tools can support knowledge management by structuring project information and facilitating access to knowledge generated throughout project activities. Research on task management systems has similarly shown that web-based platforms can organize work activities into structured processes, enabling users to monitor task status and improve the visibility of operational responsibilities (Sulistyadewi et al., 2023). In organizational settings, Trello has been examined as a knowledge management platform capable of supporting task organization and improving intern performance, indicating that its visual board structure can facilitate the management of work-related activities (Fadhilah & Nurmiati, 2022). A project-based learning monitoring application also demonstrates that digitally structured monitoring can connect activity tracking with progress information, suggesting that monitoring systems are particularly valuable when multiple actors need access to the same status information (Bonda Sisephaputra et al., 2023). These findings collectively suggest that the effectiveness of digital monitoring depends less on digitizing records alone than on establishing an information structure through which tasks, actors, status changes, and workflow stages remain visible and mutually connected.

Despite this growing body of research, important conceptual and empirical limitations remain in the application of digital task and project management systems to organizational improvement workflows. Existing studies frequently examine task management in educational environments, general web-based task administration, or project management contexts, while relatively limited attention has been directed toward cross-functional request monitoring in manufacturing organizations where a single request may move through several actors and organizational stages. Khaokaew et al. (2022) emphasize that task management needs in contemporary work environments involve not only task recording but also contextual information, coordination, and timely access to relevant work status. Research on project management information systems further indicates that the relationship between information systems and managerial performance depends on how effectively project information supports coordination and managerial decision-making rather than simply on the availability of digital technology (Monteiro et al., 2025). Recent systematic evidence also positions PMIS as an increasingly important component of project governance and information integration, while highlighting the continuing diversity of system functions and organizational contexts investigated in the literature (Massimo et al., 2025). This gap becomes particularly evident when monitoring requirements involve improvement requests that originate from users, are processed by technical personnel, and require Document Control to maintain visibility over the overall workflow. A digital monitoring mechanism therefore needs to address not only task status but also information transparency, actor coordination, process traceability, and reduction of fragmented administrative practices.

PT XYZ is a manufacturing company engaged in the production of paints, coatings, adhesives, thinner, and other supporting chemical materials, and its operational environment requires coordination among different functions to ensure that work requests and improvement activities are processed consistently. The company was established in Bandung, West Java, in 1973 and subsequently developed from a business initially focused on the distribution of building materials and coating products into a national manufacturing organization emphasizing product quality, innovation, and continuous research. Within this organizational setting, observations and system analysis indicate that monitoring requests and work status between departments has previously relied on manual mechanisms and has not been fully integrated through a digital monitoring system. Such conditions can delay access to current work-status information, reduce transparency for users submitting requests, and maintain dependence on paper-based records, particularly when a request passes through several actors with different responsibilities. Digital transformation in manufacturing has demonstrated the potential of integrated information technologies to support planning, monitoring, data management, and visibility of work-in-progress activities, although much of the existing emphasis remains directed toward production planning and control rather than cross-functional improvement requests (Alexopoulos et al., 2022). Digital archive development has also demonstrated the value of replacing conventional information administration with electronic systems that improve information management and monitoring, yet the primary focus remains on archival processes rather than the end-to-end progression of operational requests (Rohmawati et al., 2023). The practical problem at PT XYZ therefore concerns the absence of a sufficiently structured mechanism through which request submission, task execution, progress updating, and completion can be monitored within a shared information environment.

The urgency of addressing this problem is reinforced by the increasing need for organizations to establish work processes that are transparent, traceable, and responsive without introducing excessive technological complexity. A Document Management System can contribute to paperless transformation and improve organizational efficiency, but its effectiveness is closely related to organizational maturity and the management of information throughout the system life cycle rather than to digitization alone (Sternad Zabukovšek et al., 2023). Project management information systems have also been associated with improved managerial performance because they provide structured information that can support monitoring, coordination, and decision-making throughout project activities (Monteiro et al., 2025). Research on resource and task allocation demonstrates that information systems can assist organizations in coordinating tasks and resources more systematically, particularly when multiple activities must be managed simultaneously (Pratama et al., 2023). Recent research on project tracking systems further illustrates the relevance of digital platforms for providing structured mechanisms to monitor project activities and their progress within organizational environments (Masria et al., 2026). These developments provide a strong basis for positioning Trello not simply as a productivity application but as a configurable visual monitoring platform in which each request can be represented as a card and progressed through predefined workflow stages. The proposed approach responds to the operational need at PT XYZ by connecting users, TMIS, and Document Control & System Integration through a common monitoring structure that can reduce information fragmentation while preserving a relatively accessible implementation model.

The position of this research lies at the intersection of digital project management, task management, information engineering, and intelligent engineering-oriented system design, with a specific emphasis on transforming fragmented manual monitoring into an integrated workflow for cross-functional improvement requests. The research addresses a context that remains insufficiently represented in previous studies by adapting Trello-based monitoring to the actual coordination requirements of a manufacturing organization rather than treating the platform as a generic task-listing application. The system is designed through an Information Engineering and System Design & Engineering perspective by identifying problems, stakeholders, system objectives, performance measures, decision criteria, and alternative solutions before translating the resulting requirements into system representations. Use Case and Activity Diagrams are employed to formalize interactions among User, TMIS, and Document Control & System Integration and to establish a clear relationship between request submission, task management, progress updating, monitoring, and completion. The study aims to analyze the existing monitoring mechanism for work requests at PT XYZ and design a Trello-based application monitoring system that provides a structured, transparent, and integrated workflow for managing improvement activities. Its theoretical contribution is to extend the discussion of digital task and project management toward cross-functional monitoring in a manufacturing context, while its methodological contribution lies in demonstrating how Information Engineering and system-design principles can be operationalized to configure a lightweight digital monitoring architecture around organizational workflow requirements. The resulting design is expected to provide a practical foundation for reducing paper-based monitoring, improving the accuracy and visibility of progress information, strengthening coordination among organizational actors, and supporting a more integrated approach to work-request management at PT XYZ.

RESEARCH METHODS

This study employed a non-empirical system design approach because the research focused on analyzing the existing work-monitoring mechanism and developing a proposed digital monitoring system rather than conducting a controlled experimental intervention. The research framework adopted an Information Engineering and System Design & Engineering approach to translate organizational problems, stakeholder requirements, process characteristics, and system objectives into a structured system design. The research stages consisted of identifying the existing monitoring condition, identifying stakeholders and system requirements, analyzing operational problems, formulating system objectives, and designing the proposed digital monitoring mechanism, consistent with the role of project management information systems in structuring tasks, information, and organizational activities (Massimo et al., 2025). The proposed system involved three main actors, namely User, TMIS, and Document Control & System Integration, with each actor assigned specific responsibilities related to request submission, work processing, status updating, monitoring, and completion. Trello was selected

as the implementation platform because its board-based structure can support the organization of tasks and knowledge through visually accessible work information, while previous research has demonstrated its applicability in task management and performance support (Fadhilah & Nurmiati, 2022). The complete research procedure, beginning with identification of the existing condition and continuing through problem identification, stakeholder analysis, requirement formulation, and system design, is presented in Figure 1.

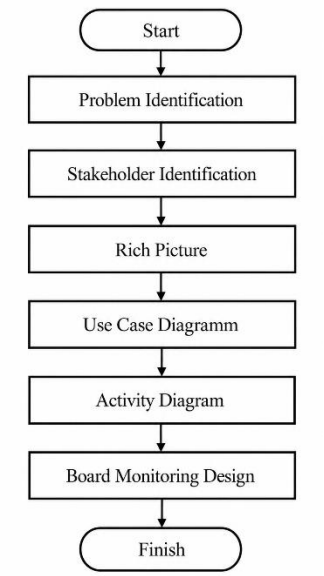

Figure 1. Research Flowchart

The system design stage translated the identified requirements into functional and process models using Use Case Diagram and Activity Diagram to represent actor relationships, system functions, and the sequential flow of work requests. The Use Case Diagram defined the interaction between User, TMIS, and Document Control & System Integration, whereas the Activity Diagram described the process from request submission and verification through work execution, status updating, monitoring, and completion. The proposed Trello architecture organized the monitoring environment into a centralized board containing workflow lists and request-specific cards, with each card representing an individual work request and containing relevant information regarding the request, responsible actor, progress, and completion status. This visual task structure was considered appropriate because project management tools can facilitate task organization, information accessibility, and coordination among actors involved in project activities (Agrawal et al., 2023). Technical validation was conducted through requirement-to-function mapping and consistency checking to determine whether every identified problem and system requirement had been represented by an appropriate system function, actor responsibility, or workflow component. The evaluation focused on functional completeness, workflow consistency, information transparency, request traceability, coordination support, and reduction of paper-based monitoring, rather than statistical performance testing, because the study produced a system design rather than an experimentally tested software implementation, consistent with the importance of structured task and progress monitoring in digital work environments (Khaokaew et al., 2022).

RESULTS AND DISCUSSION

Problem Identification, Stakeholder Analysis, and Rich Picture

The identification of problems was conducted to establish a structured representation of the existing monitoring conditions before defining the functional requirements of the proposed Trello-based system. The analysis indicates that the monitoring of work requests and improvement activities at PT XYZ remains constrained by fragmented information flows, manual status updates, and dependence on paper-based records, which collectively reduce the visibility of work progress across departments. These conditions are particularly relevant in a multi-division manufacturing environment because the

movement of a request from submission to completion requires information to remain accessible to different actors with distinct responsibilities. Project management tools are increasingly positioned as mechanisms for organizing tasks, responsibilities, and project information in a more structured and accessible manner (Agrawal et al., 2023). The identified elements of the problem were therefore organized according to the entities involved, decision makers, objectives, performance measures, decision criteria, alternative courses of action, and organizational context, as presented in Table 1. The structure in Table 1 provides the analytical basis for determining whether the proposed monitoring system can address operational requirements while remaining functionally and economically appropriate for the organizational environment.

Table 1. Problem Element Identification

Problem Element	Description
Entities	IT Division of PT XYZ / IT Division of PT XYZ
Decision Maker	IT Division of PT XYZ / IT Division of PT XYZ
Objective	1. Reduce the use of paper as a monitoring medium 2. Facilitate real-time monitoring of work status and cross-divisional work monitoring 3. Improve the accuracy of work progress in each division 4. Support the Document Control Division in conducting integrated monitoring.
Performance Measure	1. Level of work-status transparency 2. Speed of obtaining request-status information 3. Reduction in paper usage.
Decision Criteria	**Functional Aspect:** 1. Support transparent cross-divisional monitoring 2. Ease of system use by users across divisions 3. Ease of future integration. **Economic Aspect:** Compatibility between implementation costs and the company's resource limitations.
Alternative Course	Implementing a web-based monitoring system in accordance with the internship mentor's direction and the company's internal policies by utilizing the company's Trello-based system.
Context	PT XYZ has work-request and system-improvement activities involving multiple divisions; therefore, an integrated monitoring system is required to support transparency, efficiency, and paper-use reduction.

The analytical structure demonstrates that the principal issue is not simply the absence of a digital medium, but the lack of a common information environment capable of connecting request status, responsibilities, progress, and monitoring activities. The objectives specified in Table 1 indicate that the proposed solution must simultaneously address informational, operational, and economic considerations rather than focusing exclusively on technological implementation. The emphasis on transparency and speed of obtaining status information reflects the requirement for monitoring information to be available to relevant actors without repeated interpersonal inquiries or separate administrative exchanges. Research on task-management needs in contemporary work environments similarly emphasizes the importance of timely and contextual access to task information when individuals coordinate activities within organizational settings (Khaokaew et al., 2022). The performance measures consequently position information transparency, status-access speed, and paper reduction as indicators for assessing the conceptual adequacy of the proposed solution. This orientation is consistent with the broader development of digital project management, in which changing work environments require information systems that can support more adaptive and visible task coordination (Wu, 2022). The alternative selected from the analysis was a Trello-based monitoring mechanism

because it provides a comparatively accessible structure for representing work requests while allowing the organization to configure workflow stages according to its internal requirements.

Stakeholder identification was subsequently performed to clarify the distribution of authority, information requirements, operational responsibilities, and system-control functions among the parties involved in the monitoring process. The analysis distinguishes between parties who own the problem, require the resulting service, operate the system, control the monitoring process, and perform the analytical activity, thereby preventing the proposed system from treating all users as having identical roles. The resulting stakeholder structure is presented in Table 2, where the Division Head of TMIS is positioned as the Problem Owner, the requesting departments as Problem Customers, departmental users or PICs as Problem Users, TMIS as the System Operator, Document Control & System Integration as the System Controller, and the internship student as the Problem Analyst. Such role differentiation is important because information systems designed for project and task management require clearly defined relationships between users, information, and responsibilities to support coordinated work processes (Massimo et al., 2025). The stakeholder classification also establishes the basis for determining access privileges and the flow of information within the proposed monitoring system. The resulting mapping indicates that the system must accommodate both operational interaction and managerial oversight rather than functioning solely as a repository for work-request records.

Table 2. Stakeholders

Category	Description
Problem Owner	Division Head TMIS PT XYZ, as the party authorized to make decisions and determine the priority of requests.
Problem Customer	Users from the relevant divisions or departments, who submit requests and utilize the results of work monitoring.
Problem User	Users or PICs from the relevant departments, who use the system to monitor work status and request results.
System Operator	TMIS PT XYZ, which operates the system and updates work status.
System Controller	Document Control & System Integration, which conducts checking, supervision, and evaluation of the monitoring system.
Problem Analysis	Internship student, who conducts the analysis and design of the Trello-based monitoring system.

The stakeholder configuration reveals a multi-layered coordination structure in which the authority to prioritize requests, the responsibility to execute work, and the responsibility to monitor system information are distributed among different organizational roles. The Problem Owner requires sufficient visibility to support prioritization, whereas the Problem Customer and Problem User require accessible status information to determine whether their submitted requests have progressed appropriately. TMIS occupies an operational position because it is responsible for processing incoming requests and updating the corresponding work status, while Document Control & System Integration provides a monitoring and control function across the information flow. Project management information systems can strengthen managerial activities when the information generated by operational processes is structured to support coordination and decision-making (Monteiro et al., 2025). The distinction between System Operator and System Controller is particularly relevant because it creates a conceptual separation between updating operational information and supervising the integrity of the monitoring process. The stakeholder model therefore provides a logical foundation for assigning system functions and access rights in subsequent Use Case and Activity Diagram development. It also indicates that the proposed system should facilitate horizontal information sharing between departments while retaining vertical control through designated managerial and monitoring roles.

The stakeholder relationships and identified problem elements were further synthesized through a Rich Picture to obtain a comprehensive representation of the existing monitoring environment. The Rich Picture was used to visualize interactions among the requesting User, departmental PIC, Document Control, and TMIS, including the movement of information and dependencies that emerge during request processing. The visualization indicates that the existing workflow is characterized by separated activities and substantial dependence on manual communication, making information about request

progress difficult to maintain consistently across actors. Digital transformation in organizational environments has been associated with efforts to integrate information and improve the visibility of operational processes, although implementation requirements vary according to organizational context and process characteristics (Alexopoulos et al., 2022). Figure 2 presents the Rich Picture developed for PT XYZ and illustrates the relationships among the actors involved in monitoring work requests and improvement activities. The visual representation provides a basis for interpreting the problem as an information-integration issue rather than merely a documentation problem, because delays can arise when actors depend on different channels to obtain or update the same status information. This interpretation is reinforced by research showing that digital information-management systems can reduce dependence on conventional documentation practices when organizational information is transferred into a structured electronic environment (Rohmawati et al., 2023).

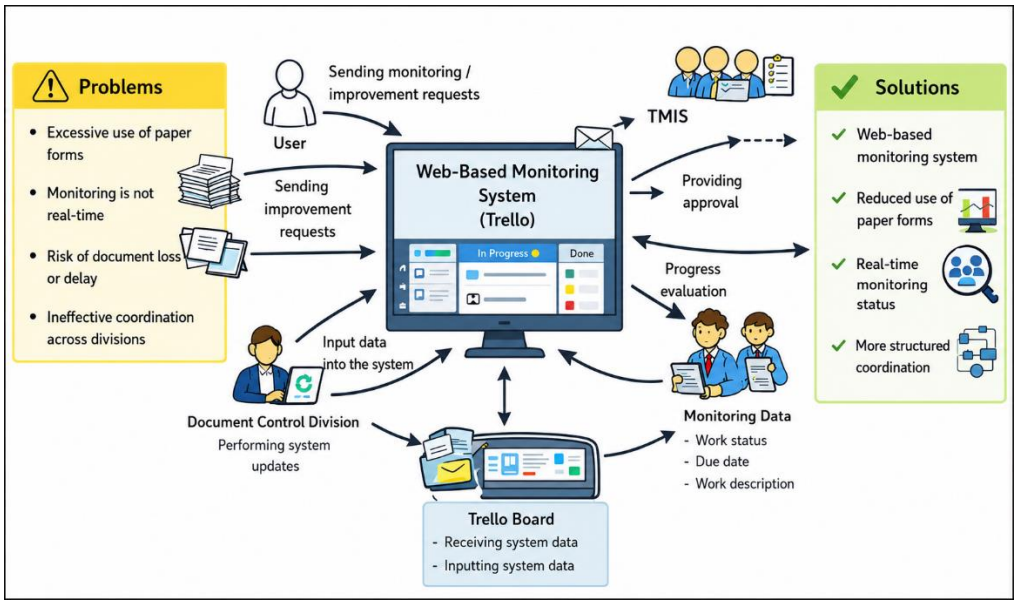

Figure 2. Rich Picture

The Rich Picture identifies three interconnected consequences of the existing arrangement, namely delayed status updates, limited transparency of work progress, and continued dependence on physical documents. These consequences are mutually reinforcing because fragmented communication makes it difficult to maintain a consistent status record, while the absence of a shared status record encourages actors to rely on direct communication and separate documentation. The problem is therefore systemic, involving the relationship between actors, information, workflow, and monitoring mechanisms rather than an isolated deficiency in record keeping. Document management research emphasizes that digital transformation requires attention to information-management processes and organizational readiness across the life cycle of the system rather than simply replacing paper with electronic files (Sternad Zabukovšek et al., 2023). From an engineering-system perspective, the Rich Picture establishes the conceptual transition from problem diagnosis toward system requirements by showing which information relationships need to be integrated within the proposed monitoring environment. The identified relationships subsequently guide the formulation of the Use Case Diagram, particularly in defining the responsibilities of User, TMIS, and Document Control & System Integration. The resulting analytical model establishes that the Trello-based solution should function as a shared monitoring environment capable of representing request progression, supporting role-specific interactions, and improving information traceability throughout the work process.

Use Case Model of the Proposed Monitoring System

The Use Case Diagram was developed to translate the problems and stakeholder relationships identified in the previous analysis into a structured representation of the functional requirements of the proposed Trello-based monitoring system. The model establishes three principal actors, namely User, TMIS, and Document Control & System Integration, whose interactions are differentiated according to

their responsibilities in submitting, processing, monitoring, and controlling work requests. The User represents the Section Head or Department Head who initiates a request for improvement or the creation of a new document and subsequently monitors the progress of the submitted request. TMIS functions as the operational actor responsible for reviewing incoming requests, updating work progress, editing request information, and providing evidence of completed activities. Document Control & System Integration occupies a control-oriented position by managing the monitoring environment, receiving system-update requests, supervising information, and facilitating communication among relevant actors. This role differentiation is important because project management information systems require clearly defined information flows and responsibilities to support effective coordination among actors involved in project activities (Massimo et al., 2025). The functional relationships among the three actors are represented in Figure 3, which provides the basis for determining how responsibilities are distributed within the proposed monitoring architecture.

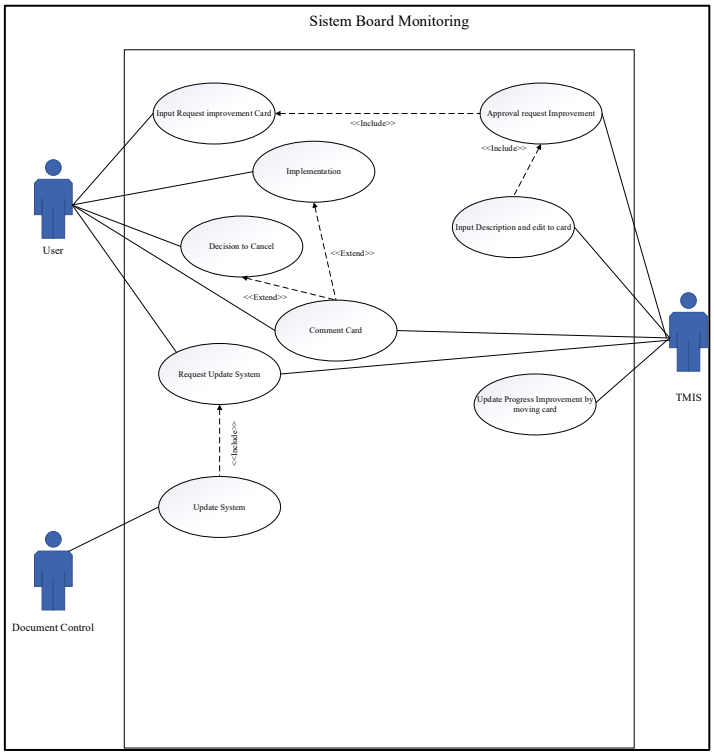

Figure 3. Use Case Diagram

The User interaction model consists primarily of the Input Request, Monitor Status, and Move Card to Implementation functions, which collectively represent the user-side lifecycle of a work request. Through the Input Request function, the User is required to create a card containing relevant request details so that the submitted improvement activity can be formally represented within the monitoring board. The Monitor Status function allows the User to observe changes in the request position and progress without depending on repeated direct communication with the responsible department. The Move Card to Implementation function represents the stage in which the User has attempted or implemented the requested improvement, providing an operational indication that the output of the request has reached the user-side implementation stage. This structure reflects the importance of providing workers with accessible and contextual task information, particularly when task progress must be followed across organizational boundaries (Khaokaew et al., 2022). The separation of these functions also creates a clearer distinction between request initiation, progress observation, and confirmation of implementation, reducing ambiguity regarding the current position of a request within the workflow.

The TMIS actor is positioned as the principal operational processor of incoming requests, with functional responsibilities concentrated on Update Progress and Edit Card activities. After a request enters the monitoring system, TMIS evaluates the information provided and determines the subsequent

treatment of the request based on its relevance and feasibility within the organization's work process. When a request is accepted for processing, TMIS can update the card position and modify relevant information to reflect the current stage of execution. The ability to update progress within a centralized task environment is significant because project management tools can improve the organization of work information and provide a common reference point for activities that involve multiple participants (Agrawal et al., 2023). The Edit Card function also permits TMIS to maintain the accuracy of request information when changes occur during implementation, while supporting the attachment of evidence associated with completed work. This functional arrangement establishes TMIS as the operational bridge between the request submitted by the User and the monitoring activities conducted by Document Control & System Integration.

Document Control & System Integration is designed as the principal control actor because its responsibility extends beyond individual task execution to the supervision and maintenance of the monitoring process. The actor has access to system-management functions and receives system-update requests originating from TMIS or Users when changes to the monitoring environment or related information are required. The Comment Card function provides an interaction mechanism through which TMIS and Users can exchange information regarding request conditions, decisions, or required actions without separating the discussion from the corresponding work request. Such integration is consistent with the role of digital project-management environments in supporting information accessibility and coordination throughout project activities (Clemente & Domingues, 2023). The User can also communicate a decision to cancel through the comment mechanism, allowing a change in request status to remain associated with the relevant card rather than being recorded through an independent communication channel. This arrangement provides a traceable interaction structure in which operational updates, user responses, and monitoring activities remain connected to the same information object.

The Use Case model also establishes a logical relationship between authority and information visibility, particularly through the distinction between request submission, operational processing, and monitoring control. User access is oriented toward initiating and observing requests, TMIS access is oriented toward processing and updating operational progress, while Document Control & System Integration maintains broader control over the monitoring environment. Such differentiation prevents the monitoring board from becoming an undifferentiated information repository in which all actors possess equivalent responsibilities and access to process-changing functions. Digital task-management systems are more effective when their functions correspond to actual task-management requirements and organizational roles rather than merely reproducing existing administrative records in digital form (Khaokaew et al., 2022). The model therefore transforms the stakeholder structure identified previously into explicit system functions that can be implemented through the Trello board. The relationship between the actors and functions further provides a basis for evaluating whether the proposed system addresses the initial requirements concerning transparency, coordination, progress accuracy, and reduction of fragmented monitoring activities. In this sense, the Use Case Diagram represents not only a technical specification but also a control mechanism for aligning organizational responsibilities with information-system functionality.

The resulting functional model provides the conceptual foundation for translating the proposed monitoring process into sequential activities and status transitions in the subsequent Activity Diagram. Each principal use case corresponds to a specific information requirement, beginning with the creation of a request and continuing through review, progress updating, communication, implementation, and monitoring. This structure is consistent with research on project tracking information systems, which emphasizes the importance of structured digital mechanisms for following project activities and their status within organizational settings (Masria et al., 2026). The model also accommodates future development because the separation of actors and functions allows additional workflow stages or system integrations to be introduced without changing the fundamental responsibilities of the existing actors. The proposed arrangement is particularly relevant to PT XYZ because cross-divisional requests require a shared view of progress while retaining operational authority within the responsible TMIS function. The Use Case Diagram consequently establishes a functional architecture in which transparency is generated through shared status visibility, accountability is supported through role-based responsibilities, and traceability is maintained through request-specific information. These

characteristics provide the analytical basis for developing the Activity Diagram, where the functional relationships are further transformed into explicit process sequences and decision points.

Activity Modeling and Workflow of the Monitoring Process

The Activity Diagram was developed to translate the functional relationships identified in the Use Case Diagram into a sequential workflow that describes how improvement requests move through the proposed monitoring system. The model focuses on three principal processes, namely Input Request Improvement, Approval Request Improvement, and Update System Monitoring, which represent the major operational pathways identified from the requirements analysis. Each process establishes a defined relationship between User actions, system responses, and TMIS or Document Control activities, allowing the movement of information to be represented according to the responsible actor. The workflow adopts the Trello card as the primary information object, so that changes in the position or content of a card correspond to changes in the status or information associated with a particular request. This approach is consistent with task-management systems that structure work into identifiable activities and status information to improve monitoring and coordination among users (Sulistyadewi et al., 2023). The resulting process models are presented through Figures 4–6, which provide the technical representation of how requests are initiated, assessed, updated, and communicated within the proposed system.

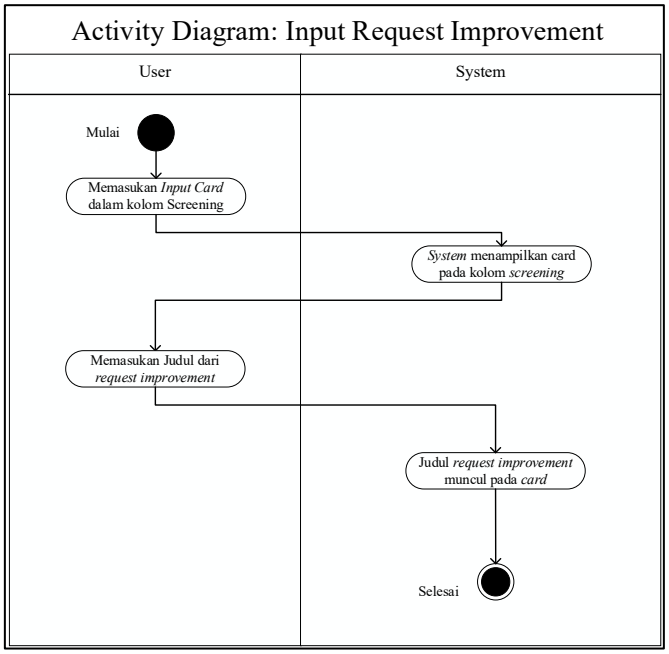

Figure 4. Activity Diagram of Input Request Improvement

The Input Request Improvement process begins when the User accesses the main dashboard and creates a card within the Screening column as the initial representation of a new improvement request. The User then enters the request title and relevant information so that the system displays the submitted request as an identifiable card within the monitoring board. This process transforms an initially informal request into a structured digital object that can be followed by the responsible actors without relying exclusively on separate communication or paper documentation. The card-based representation is particularly relevant because digital project-management tools provide mechanisms for organizing work items and making task information more accessible to participants (Agrawal et al., 2023). The Screening position also provides an explicit starting point for the workflow, allowing TMIS to distinguish requests that have entered the system from requests that have already undergone assessment. The resulting process establishes traceability from the moment a request is submitted and creates the initial information state required for subsequent approval and progress-monitoring activities.

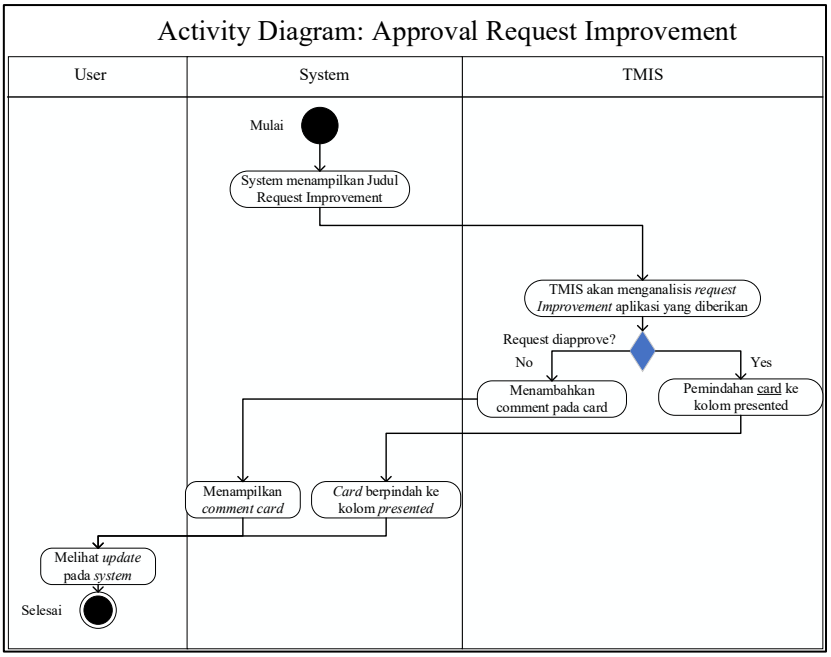

Figure 5. Activity Diagram of Approval Request Improvement

The Approval Request Improvement process represents the decision stage in which TMIS reviews the improvement request displayed by the system and determines whether the request can proceed to the next workflow stage. When the request is approved, TMIS moves the corresponding card from the Screening column to the Presented column, thereby providing a visible indication that the request has passed the initial assessment. When the request is rejected, TMIS records the reason for rejection through the Comment Card function, allowing the User to access the decision and its associated explanation directly from the request record. This mechanism establishes a clear relationship between decision, status, and supporting information rather than separating approval decisions from the request itself. The use of structured project-management information can improve coordination because relevant actors can access information concerning task progress and managerial decisions within a common information environment (Monteiro et al., 2025). The approval workflow therefore provides a formal transition between request screening and subsequent implementation activities while maintaining information traceability for both approved and rejected requests.

The approval mechanism also introduces a decision-control point that is important for preventing every submitted request from immediately entering the implementation stage without organizational assessment. TMIS acts as the operational decision actor, while the User remains informed of the outcome through the status of the card or the explanation recorded in the comment function. This arrangement creates an explicit separation between initiating a request and authorizing its progression, which is relevant when improvement activities may require consideration of technical feasibility, organizational priorities, or available resources. Project management information systems can support coordination and resource-related decision processes when task information and responsibilities are represented in an organized digital environment (Pratama et al., 2023). The card transition from Screening to Presented consequently functions as more than a visual movement because it represents a defined process state with an associated organizational decision. The model also provides a basis for subsequent progress tracking because an approved card can continue through additional stages without requiring the User to recreate the request information.

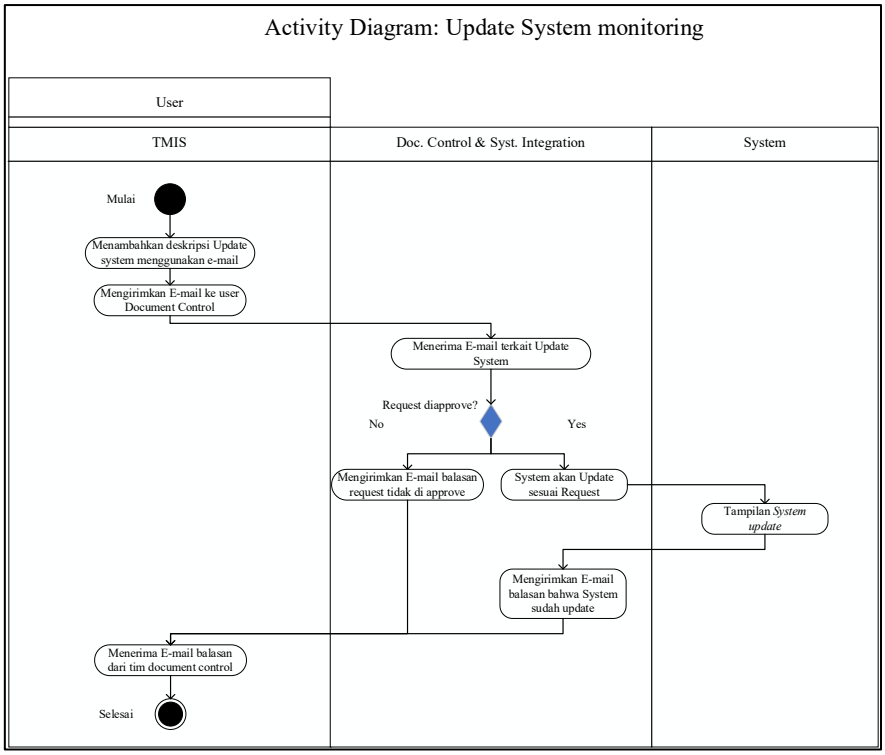

Figure 6. Activity Diagram of System Monitoring Update

The Update System Monitoring process describes the mechanism through which requests for changes or updates to the monitoring system are communicated, assessed, and implemented. In this process, the User provides an update description through email or communicates the required system change to the Document Control user, after which the system receives the submitted update information for further assessment. The system then determines whether the requested update is approved, with rejected requests generating a response to the User and approved requests proceeding to implementation within the monitoring system. This workflow introduces a controlled update mechanism in which system changes are not directly applied without an approval decision, thereby supporting consistency between requested modifications and the established monitoring structure. The principle of structured digital information management is relevant to this mechanism because effective digital transformation requires organizations to manage information processes systematically rather than simply transfer existing manual activities into electronic form (Sternad Zabukovšek et al., 2023). Once an approved update has been implemented, the User is notified that the requested change has been completed, creating a closed communication loop between the request, decision, implementation, and notification stages.

Taken together, the three activity models establish a continuous workflow in which the improvement request progresses from submission, screening, approval, execution, implementation, and monitoring, while system-update requests follow a controlled pathway from communication to assessment, implementation, and notification. The workflow reduces the separation between operational activities and monitoring information because the status of a request is represented through a defined sequence of activities rather than relying on independent records maintained by different parties. Recent research on digital project tracking supports the relevance of structured tracking mechanisms for providing organizations with clearer visibility of project and task progression (Masria et al., 2026). The Activity Diagram also clarifies the points at which human decisions are required and the points at which the system primarily functions as an information medium, which is important for maintaining realistic alignment between organizational authority and digital functionality. The resulting model provides a stronger basis for implementing the Trello board because each activity can be translated into a corresponding card action, status transition, comment, or information-update mechanism. The process design therefore connects the conceptual requirements identified during problem analysis with concrete workflow behavior that can be represented within the proposed

monitoring environment. This relationship establishes the foundation for the final design of the Trello monitoring board and its accompanying work instructions.

Trello-Based Monitoring Board Design and Work Instruction

The Trello-based monitoring board was designed as the operational representation of the workflow established through the problem analysis, stakeholder identification, Use Case Diagram, and Activity Diagram. The design places the work request as the central information object, represented by a **card** containing the request title, description, responsible party, progress information, communication history, and evidence of completion. The board functions as a shared monitoring environment, while each list represents a defined stage through which a request progresses according to its current status. This configuration is consistent with the function of digital project-management tools in organizing tasks, responsibilities, and work information within a centralized environment (Agrawal et al., 2023). The movement of each card is designed to represent an actual change in work status rather than merely serving as a visual arrangement of activities. This configuration connects the conceptual workflow with an operational monitoring mechanism that can be applied to the work-request process at PT XYZ.

The board configuration uses **Screening, Presented, and Implementation** as the principal workflow stages for managing improvement requests. The Screening stage represents newly submitted requests that require initial assessment, while the Presented stage indicates that a request has passed the approval process and can proceed to subsequent activities. The Implementation stage represents the condition in which the User has attempted or applied the requested improvement, creating a distinction between the processing of the request by TMIS and its practical application by the requesting User. The visual organization of task stages can improve work visibility because users can identify the current position of an activity without reconstructing its status from separate communication channels (Fadhilah & Nurmiati, 2022). Each actor can therefore interpret the position of a card according to the predefined workflow and its associated responsibility. The board transforms the process model into an operational structure in which the progression of each request can be monitored through identifiable status transitions.

The information contained within each card is structured to preserve the relationship between the original request and the activities performed to address it. The User initiates the card by entering the request title and required information, while TMIS updates the card when the request has been assessed, processed, or completed. The Comment Card function provides an integrated communication mechanism for recording decisions, explanations, clarifications, and responses associated with the request. The integration of task information and communication within the same work object supports the knowledge-management function of project-management tools because information generated during work activities remains connected to the corresponding task (Clemente & Domingues, 2023). Evidence of completed activities can also be attached to the card to strengthen the relationship between reported progress and supporting documentation. This configuration improves request traceability because status, communication, and supporting information remain associated with the same digital work object.

The work instruction was developed to standardize interaction with the monitoring board and establish consistent procedures for submitting, updating, monitoring, and completing requests. The instruction differentiates the responsibilities of User, TMIS, and Document Control & System Integration so that each actor has a defined operational role throughout the request lifecycle. Standardized procedures are important because the effectiveness of a digital task-management system depends not only on the availability of technical functions but also on their consistent application within organizational processes. Research on task-management system design indicates that digital workflows are more useful when system functions are aligned with actual user requirements and organizational activities (Hidayatuloh & Dinillah, 2025). The work instruction therefore functions as an operational complement to the system model by translating the designed workflow into specific actions that can be followed during routine monitoring. The detailed sequence of activities is presented in Table 3. Work Instructions, which provides the operational guidance for using the proposed monitoring system.

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Table 3. Work Instructions

INTRUKSI KERJA
AABF.XX.XX

Disahkan	Tanggal	Halaman
	Nomor	

PENGGUNAAN SISTEM MONITORING IMPROVEMENT APLIKASI (DISTRIBUSI)

YANG TERKAIT			NO.	URAIAN AKTIVITAS	FORM/ DOKUMEN YANG DIGUNAKAN	KRITERIA	POTENSIAL MASALAH	PELUANG
USER	TMIS	DOC. Control & Syst.Integration						
Mulai 1. Menambahkan *card* pada bagian *screening*			1	*User* menambahkan *card* dengan melakukan add *card* pada kolom bagian *screening*				Penggunaan sistem dapat meminimalisir penggunaan formulir
2. Mengisikan Judul dan deskripsi PIC *System*			2	Setelah *Card* ditambahkan user mengisikan judul dari *request improvement* yang akan dijalankan serta memasukan *pic system* pada card		- Judul Improvement - Deskripsi PIC System		
	3. TMIS menganalisis request *improvement* aplikasi		3	Divisi TMIS akan menganalisa terlebih dahulu *request improvement* yang diminta oleh *user*				
	4 Pemindahan *card* ke kolom *presented* disertai penambahan detail		4	Divisi TMIS memindahkan *card* dari kolom *screening* ke kolom *presented* disertai dengan penambahan deskripsi detail-detail yang dicantumkan		- Programmer - Analyst - Project Manager		
	5. Pemindahan *card* sesuai dengan *progress* yang dijalankan A		5	TMIS akan menindahkan *card request improvement* ke kolom kolom setelahnya sesuai dengan *progress* yang dijalankan			pemindahan *card* tidak sesuai antara kolom dan *progress* yang sebenarnya	
A 6. *User* Melakukan Pemantauan *progress request* *Request Cancel*	*Request* dilanjutkan		6	*User* melakukan pemantauan terhadap *progress* dari *request* improvement yang ditambahkan *user* bisa untuk melanjutkan ataupun membatalkan *request* bila user melakukan pembatalan *request improvement* langkah selanjutnya pada proses 7.a			*user* memindahkan *card* secara tidak sengaja	user dapat melihat *progress* dari *request* secara *real time*
7a. *User* meminta *cancel* kepada TMIS pada bagian *comment* dalam *card*	7b. TMIS konfirmasi ulang ke *User* pada bagian *comment*		7	*User* meminta *cancel request improvement* ke divisi TMIS pada *comment* dalam *card request improvement* dan dikonfirmasi ulang oleh TMIS		-alasan pembatalan		
Cancel 8.a *User* melakukan konfirmasi ke *TMIS*	*Tidak Cancel* 8.b *Progress* akan tetap dilanjutkan		8	**Cancel** *User* melakukan konfirmasi pada *section comment* bahwa *request* ingin di *cancel* dan dilanjutkan ke langkah 9 **Tidak Cancel** *User* akan melakukan konfirmasi bahwa *progress* akan tetap dilanjutkan				
	9. TMIS menghentikan *progress improvement* B		9	Divisi TMIS akan menghentikan *progress improvement* dan memindahkan section card ke kolom *cancel*				
B 10. *User* memantau sistem monitoring *Improve system* *Yes*	*No*		10	User *selain* memantau *progress* TMIS User dapat melakukan proses pemantauan dari sistem monitoring itu sendiri bila user ingin melakukan perubahan pada sistem monitoring maka progress berlanjut ke 10.a yang dimana user akan mengirimkan e-mail ke pihak Document Controller & System Integration dan akan diterima oleh pihak Document Controller & System Integration		-nama user -jabatan -jenis Update		
10.a *User* Mengirimkan *E-mail* pada DC&SI		10.b DC&SI Menerima E-mail dari *User*						
		11. Melakukan *Update System* sesuai *request user*	11	Tim *Document Control & System Integration* melakukan *Update System sesuai request user*				
12.b *User* menerima *E-mail* dari pihak DC& SI		12.a Mengirimkan *E-mail* pada *user* setelah *update system*	12	Tim *Document Control & System Integration* mengirimkan *e-mail* kepada user yang nantinya user akan menerima *e-mail* terkait *update system* oleh *team document control*		-nama pengirim -jabatan -isi		
	13. TMIS Memindahkan *card* ke kolom *done*		13	bila request improvement selesai dilakukan TMIS akan memindahkan progress *request* ke kolom *done*				
14. *User* mencoba terlebih dahulu *request improvement*			14	*User* nantinya akan mengecek secara langsung *improvement* aplikasi perusahaan yang diminta				
15. *User* memindahkan *card* dari kolom *done* ke implementasi Selesai			15	setelah melakukan *testing* oleh *user* ,*user* akan memindahkan card request improvement dari kolom done ke implementasi				

The work instructions establish an information cycle that begins with request submission and continues through assessment, progress updating, implementation, and monitoring. User is responsible for submitting the request and confirming implementation, TMIS is responsible for reviewing requests and updating operational progress, while Document Control & System Integration performs monitoring and information control. This distribution strengthens accountability because changes in request status are associated with specific responsibilities and defined workflow activities. Project-management information systems can support coordination and managerial activities when information is structured to facilitate monitoring, communication, and decision-making among organizational actors (Monteiro et al., 2025). The workflow also provides a foundation for future integration because individual request information and process stages are represented as distinct components within the monitoring architecture. The resulting design consequently establishes a standardized operational mechanism for managing work requests across the involved divisions.

From an information-engineering perspective, the proposed Trello board represents a transition from fragmented monitoring toward a shared workflow in which request status, responsibility, and supporting information are connected within one operational environment. The principal contribution of the design lies not simply in the adoption of Trello but in configuring its board, card, status, comment, and information functions according to the organizational requirements identified at PT XYZ. Digital project management increasingly requires adaptable work environments capable of supporting changing coordination patterns and information requirements (Wu, 2022). The proposed configuration addresses this requirement through the integration of role-based responsibilities, sequential status transitions, card-level documentation, communication, and centralized monitoring. The design is expected to improve visibility of request status, reduce unnecessary status inquiries, support cross-divisional coordination, and decrease dependence on paper-based monitoring. Because the present research adopts a non-empirical system-design approach, these benefits constitute design objectives rather than experimentally verified performance outcomes, providing a clear basis for subsequent implementation and empirical evaluation.

CONCLUSION

Based on the analysis and system design conducted in the Internal Audit Department, particularly within the Document Control & System Integration function of PT XYZ, the existing mechanism for monitoring work requests and system updates was found to remain manual and fragmented. This condition resulted in delayed status updates, limited progress transparency for users, and considerable dependence on physical documents for monitoring activities. The analysis further indicated that the involvement of multiple organizational actors created a need for a centralized monitoring mechanism capable of connecting request information, work progress, and responsibilities across divisions. The proposed design employed an Information Engineering approach supported by stakeholder identification, Rich Picture analysis, Use Case Diagram modeling, and Activity Diagram modeling to translate organizational requirements into a structured monitoring workflow. The resulting model clearly defines the responsibilities of User, TMIS, and Document Control & System Integration throughout request submission, assessment, processing, updating, implementation, and monitoring. This role-based structure provides a more systematic representation of information flow and work responsibilities than the previous fragmented monitoring mechanism. The study therefore establishes a conceptual and operational basis for transforming the existing monitoring process into a digitally structured workflow at PT XYZ.

The proposed solution consists of a digital improvement-monitoring system utilizing Trello, in which each work request is represented as a card that can be updated and moved according to predefined workflow stages. The board structure enables relevant actors to identify request status through visible transitions between stages such as Screening, Presented, and Implementation, while card-level information supports communication, progress documentation, and evidence of completed activities. The design integrates request submission, approval, progress updating, implementation, and monitoring within a shared environment, thereby supporting cross-divisional coordination and reducing dependence on paper-based monitoring. The contribution of this study lies in translating organizational

monitoring requirements into an integrated digital workflow that connects actors, information, responsibilities, and process stages within a single monitoring medium. The resulting design can serve as a practical foundation for PT XYZ to implement a more structured, transparent, and traceable mechanism for managing improvement requests and system updates. Because the research is limited to non-empirical analysis and system design, quantitative measurements of efficiency improvement, processing time, user performance, or paper reduction have not yet been established. Future research should implement the proposed system and evaluate its effectiveness using measurable performance indicators through before-and-after comparisons, usability assessment, processing-time analysis, and quantification of paper-based monitoring reduction.

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