IMPLEMENTATION OF SCRUM METHOD IN ERP-BASED EMPLOYEE PERFORMANCE EVALUATION SYSTEM

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ABSTRACT

Human capital is a key factor in realizing an organization's vision and mission. To ensure optimal performance, employee output must be evaluated consistently through a well-organized appraisal process. Although PT Kompas Media Nusantara has adopted such evaluations, they are still carried out using traditional methods, such as distributing physical documents. To address these inefficiencies, an ERP-based Employee Performance Evaluation System has been designed to streamline workflows, enhance accessibility, and support a more standardized and systematic assessment process. This system utilizes Key Performance Indicators (KPIs) aligned with individual job responsibilities to measure performance. The development process adopts the Scrum methodology, while system validation is carried out through Black Box Testing. The test results reveal that the system performs reliably, achieving a 100% accuracy rate in matching inputs and expected outputs. To assess user satisfaction, the End User Computing Satisfaction (EUCS) framework combined with a Likert scale was employed. The evaluation produced high satisfaction scores across various dimensions: content (89.12%), accuracy (87.02%), layout and design (88.07%), user-friendliness (89.12%), and timeliness (86.84%). These findings indicate strong user acceptance of the ERP-based system, reinforced by consistently positive user feedback regarding its effectiveness and ease of use.

Keyword: Employee Performance Assessment, ERP, Scrum, Black Box Testing, End User Computing Satisfaction.

INTRODUCTION

Kompas Daily is recognized as one of Indonesia's most prominent newspapers, headquartered in Jakarta. Operated by PT Kompas Media Nusantara, a subsidiary of the Kompas Gramedia Group (KG), the publication was founded by P.K. Ojong and Jakob Oetama on June 28, 1965. Upholding the motto "Amanah Hati Nurani Rakyat", Kompas is dedicated to delivering trustworthy, accurate, and in-depth news. As a media organization, PT Kompas Media Nusantara aspires to act as a catalyst for positive change by fostering a society that is more harmonious, tolerant, secure, and prosperous. This vision is pursued by striving to maintain Kompas's position as a market leader through optimal resource utilization and strategic collaboration with partners.

The role of human resources (HR) is pivotal in realizing this vision and mission. To support continuous quality improvement, the company conducts regular performance evaluations aimed at assessing each employee's ability to carry out their responsibilities. Performance appraisal serves as a structured process to evaluate work outcomes using objective standards (Adhawiyah et al., 2017). Given the variety of employee roles, Key Performance Indicators (KPIs) are necessary to measure progress, detect deviations, and ensure that goals are being met (Kusumanto et al., 2018).

Currently, PT Kompas Media Nusantara conducts employee evaluations based on three main components: work outcomes, work attitude, and project assignments. In terms of work results, employees are assigned an Individual Work Plan (RKI), which includes several KPIs, each with specific weights and targets. These assessments take place twice a year, during June–July for the first semester and December–January for the second. The results are then compiled to inform the Board of Directors (BOD) in their overall performance reviews.

However, the current approach remains manual and document-based, relying heavily on Excel spreadsheets that are distributed to employees. The

process typically begins with HR or organizational units drafting the RKI forms, followed by employees filling in their achievements and supervisors providing evaluations. These files are later submitted via secretaries to the HR department within the Human Resources and Operations (HRIS) unit. This method presents several challenges, such as:

1. Limited transparency for employees to track their performance progress, development recommendations, and final outcomes.
2. Inconsistent enforcement of deadlines, leading to delayed document submission.
3. High risk of human error due to manual data handling, making the process inefficient and difficult to manage systematically.

To address these limitations, a digital performance evaluation system is proposed, aiming to improve structure, transparency, and discipline within the appraisal process. The system is expected to enhance accessibility for employees, supervisors, and HR personnel while ensuring timely completion of evaluations and real-time monitoring of progress.

Prior research by (Zami & Anugrah, 2022) on KPI-based performance systems found that digital implementation significantly improved efficiency, accuracy, and reduced time consumption. Consequently, the performance assessment system at PT Kompas Media Nusantara will be integrated into the company's HR information system as part of its Enterprise Resource Planning (ERP) platform.

A study by (Santoso et al., 2023) showcased the successful implementation of an ERP-based medical reimbursement system using Odoo and the Scrum development method, which led to more efficient reimbursement processing.

The new system will be developed using the Laravel framework and managed under the Scrum methodology, an Agile-based framework that facilitates iterative development. Through sprints monitored by a Scrum Master, the team can adapt quickly and ensure progressive improvements. Prior research by (Ramadhan et al., 2019) demonstrated Scrum's effectiveness in ERP stock-taking system development, confirming its suitability for HR, finance, and performance evaluation systems.

RESEARCH METHOD
Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is a software system designed to serve as an integrated management platform that connects all operational areas within a business (Adiasih et al., 2020). Common

ERP modules typically include product planning, inventory control, material procurement, accounting, distribution, marketing, finance, and human resources (Alsharari, 2022). ERP supports HR management processes and delivers comprehensive, accurate reports to assist stakeholders in making more informed business decisions (Febrianto et al., 2022). The implementation of ERP can streamline business operations, enhance distribution and efficiency, reduce operational costs, and foster overall company growth (Aboabdo et al., 2019).

Laravel

Laravel is an open-source web development framework built with PHP, created by Taylor Otwell to support the development of web applications following the Model-View-Controller (MVC) architectural pattern. The framework offers built-in tools for database migration and includes various components that simplify processes such as routing and secure authentication through a session management system (Herdiansah et al., 2021). Moreover, Laravel implements the MVC pattern by providing Eloquent ORM, which acts as a database abstraction layer, allowing models to interact with each other through defined relationships (Somya & Nathanael, 2019).

Scrum

Scrum is a project management framework derived from the Agile methodology, designed to help teams organize and execute their work based on a set of values, principles, and practices that emphasize continuous learning through iterative cycles. It aims to enhance productivity during the development process, promote rhythm-based workflows, align personal and organizational decision-making, and deliver value to stakeholders. Additionally, Scrum supports high performance across various levels and fosters improvement in multiple areas of work and life (Hayat et al., 2019)

The Scrum approach is structured into several stages, which can be outlined as follows (Gonçalves, 2018)

1. Sprint Planning

The main focus of this stage is to determine and establish a realistic product backlog that meets the business and user needs to be developed in the sprint iterations. Some items from the product backlog are then moved into the sprint backlog, which will be executed over a period of approximately 1-4 weeks.

2. Daily Scrum

The stage performed daily acts as a tracker to measure progress towards the sprint goal. By setting aside 15 minutes at the same time and place every day, the team determines the development plan for the next 24 hours. This ensures that the work progresses according to the sprint backlog.

3. Sprint Review

During the sprint review, an evaluation is conducted regarding the completed backlog items during the sprint, any remaining work from the previous sprint review, and actions that can be taken to complete the current sprint within the defined timeframe. After reviewing the previous sprint, there is often an adaptation of the product backlog and the determination of the next sprint backlog.

4. Sprint Retrospective

This stage serves as a formal opportunity to focus on full inspection, adaptation, and improvement of the working procedures for the next sprint.

Black Box Testing

Black Box Testing is a software testing technique that concentrates on validating the system's functional specifications, where the testing process is carried out using predefined scenarios (Hidayat & Muttaqin, 2018). This method is considered user-friendly because testers do not need to have knowledge of the source code. The test cases are limited by specific input boundaries, namely upper and lower constraints, that must be satisfied (Cholifah et al., 2018).

This testing approach is commonly applied to identify the following issues (Purnia et al., 2019):
1. Missing or incorrect functionalities
2. Interface-related errors
3. Flaws in data structures or database access
4. Performance-related defects
5. Errors occurring during initialization or system termination

End User Computing Satisfaction (EUCS)

User satisfaction is a key metric in determining the success of an information system and can be assessed using various approaches, one of which is the End-User Computing Satisfaction (EUCS) method (Setyoningrum, 6371). EUCS provides a comprehensive evaluation by examining the factors that shape user satisfaction following the use of an information system (Adrianti & Usman, 2018).

This evaluation technique focuses primarily on the end user's satisfaction with the technological aspects of the system, and assesses the following five dimensions (Damayanti, Mursityo, & Herlambang,

2018):
1. *Content*, evaluates user satisfaction based on the quality and relevance of the system's information content.
2. *Accuracy*, measures the precision and correctness of the data presented by the system.
3. *Format*, assesses the system's user interface in terms of design, layout, and visual appeal.
4. *Ease of use*, refers to how easy it is for users to learn and operate the system effectively.
5. *Timeliness*, measures the system's ability to provide required information promptly and when needed.

Skala Likert

Likert Scale is a measurement tool commonly used to evaluate attitudes, opinions, and perceptions of individuals or groups regarding a particular social phenomenon (Suwandi et al., 2018). This scale allows researchers to break down the variables being measured into specific indicators, which are then used to develop a series of relevant questions or statements (Bahrun et al., 2018).

The Likert Scale typically employs a range of responses, from strongly positive to strongly negative, using a 5-point scoring system: 5, 4, 3, 2, and 1 for positively phrased statements, and the reverse scoring for negatively worded items (Pranatawijaya et al., 2019).

Table 1. Likert Scale

Category	Score
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

The *Likert* scale calculation formula is as follows.

$$P = \frac{(SS*5) + (S*4) + (N*3) + (TS*2) + (STS*1)}{q*s*n} * 100\%$$

Explanation:
P = Percentage of acceptance
q = Number of questions
s = Highest score
n = Number of respondents
SS = Number of strongly agree answers
S = Number of agree answers
N = Number of neutral answers
TS = Number of disagree answers
STS = Number of strongly disagree answers

The method steps carried out in this research include several things below:

A. Requirements Analysis

Each user can have multiple access rights, making them actors who can access specific features. There are three actors involved: employee, structural, and HR.

1. Employee

- Employees can log in and log out of their registered accounts.
- They are able to input performance achievements related to work results and behavioral aspects.
- Project assignment data for each semester can be recorded by the employees.
- Employees can view the approval status provided by their direct supervisors concerning performance evaluations.
- They have access to detailed performance evaluation history from previous semesters.
- Employees can submit their completed performance assessments to their immediate supervisor.
- They are also able to view feedback and recommendations given by supervisors regarding their performance over the semester.

2. Structural

- Supervisors can log in and out of the system using their registered accounts.
- They are granted access to view performance evaluation statistics and approval statuses of employees within their teams.
- Supervisors are responsible for composing individual work plans for their team members.
- Direct supervisors can assess employee performance in terms of both results and behavior.
- They may provide feedback and development suggestions to employees for each evaluation cycle.
- Direct supervisors are authorized to forward completed evaluations to higher-level supervisors.
- Higher-level supervisors can assign final scores for performance based on both results and behavioral criteria.
- They may also respond to assessments and feedback given by the direct supervisors.

- Additionally, they have the authority to escalate performance evaluations to upper-level supervisors or HR.
- Supervisors can generate statistical summaries of final performance evaluations per semester and for the entire review period (average of two semesters).

3. HR

- HR personnel can access and exit the system using their registered credentials.
- HR is responsible for viewing, drafting, and approving individual work plans across all employees.
- They can also monitor evaluation statuses and generate performance summaries by department or overall.
- HR personnel are permitted to access detailed evaluations that have been approved by the highest-level supervisor.
- Approved evaluations can be exported by HR as PDF documents per individual employee.
- They can generate statistical reports summarizing final evaluations for each semester as well as full-period averages.
- Final evaluation data for all employees can also be downloaded in Excel format.
- HR is authorized to manage employee records and oversee information related to units, divisions, departments, sections, and assessment deadlines stored in the system.
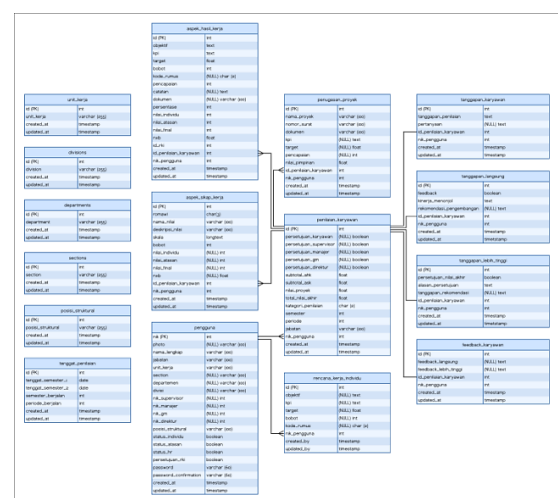
B. *Flow Diagram*

1. Entity Relationship Diagram (ERD)

Fig 1. ERD Employee Performance Appraisal System
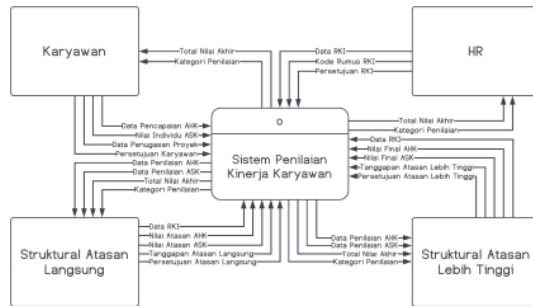
2. Data Flow Diagram (DFD)

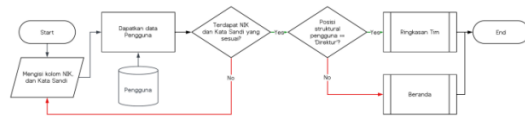**Fig 2.** DFD Employee of Performance Appraisal System

3. Flowchart

Fig 3. Flowchart Login

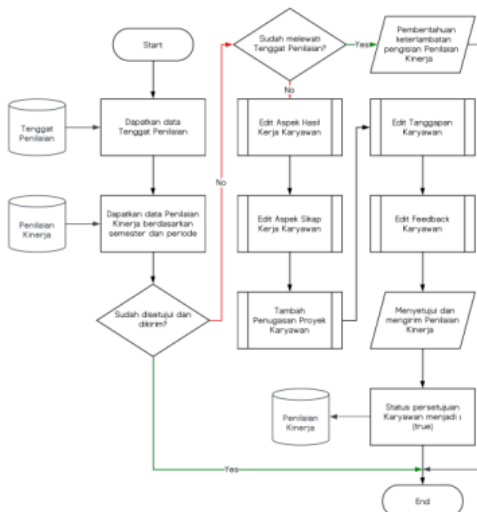**Fig 4.** Flowchart Employee Home

Fig 5. Flowchart Employee Performance Appraisal

RESULT AND DISCUSSION
Scrum Method Implementation
Sprint Planning

At the sprint planning stage, a product backlog

is determined that will be developed for business needs and user needs. The product backlog that has been set is then transferred to the sprint backlog which will be run for a period of 1 week.

a. *Product Backlog*

Before starting the sprint, the product backlog is determined through discussions with the product owner. Priority for each product backlog is determined based on difficulty and feature requirements. The product owner is the supervisor of the HRIS team consisting of the HR & Organization Dev Superintendent and Personnel Administration & Internship Staff. The product backlog is a priority list of work in each sprint iteration.

b. *Sprint Backlog*

The previously defined product backlog is moved into the sprint backlog. The sprint backlog is the work that will be done during the sprint iteration.

Table 2. Sprint & Backlog

Sprint Iteration	Backlog	Priority
1	Employee Dashboard Homepage	2
	Performance Appraisal for Employee Access	1
	Performance Appraisal History	4
	User Login	1
	User Logout	1
	Profile Details	4
	Change Password	1
2	Employee achievement input for work result aspect	1
	Employee individual rating input for work attitude aspect	1
	Structural Dashboard Summary Team	2
	Performance Appraisal for Structural Access	1
	Employee Performance Appraisal Details for Structural Access	1
3	Submission and Approval of Employee Performance Appraisal for Employee Access	1
	Direct Structural Personnel Input for Work Result Rating	2
	Direct Structural Personnel Input for Work Attitude Rating	2
	Assignment of Direct Structural Personnel or Higher-level Structural Personnel	2
4	Higher-level Structural Personnel Input for Final Work Result Rating	2
	Higher-level Structural Personnel Input for Final Work Attitude Rating	2
	Submission and Approval of Performance Appraisal for Structural Access	2
	Employee Project Assignment Addition	3
	Employee Feedback Input	5
	Direct Structural Personnel Feedback Input by Direct Structural Personnel	4

Sprint Iteration	Backlog	Priority
	Higher-level Structural Personnel Feedback Input by Higher-level Structural Personnel	4
5	HR Dashboard Summary HR	2
	Performance Appraisal for HR Access	2
	Employee Performance Appraisal Details for HR Access	2
	Individual Work Plan for Structural Access	3
	Individual Work Plan Details for Structural Access	3
6	Individual Work Plan for HR Access	3
	Individual Work Plan Details for HR Access	3
	Employee Management	5
	Data Management	5
	Final Performance Appraisal for Structural Access	3
	Final Performance Appraisal Details for Structural Access	3
	Final Performance Appraisal for HR Access	3
	Final Performance Appraisal Details for HR Access	3
7	Locking of Performance Appraisal Data if Approved by Employee / Exceeding Appraisal Deadline	1
	Locking of Performance Appraisal Data if Approved by Structural / Exceeding Appraisal Deadline	2
	Employee Performance Appraisal Updates	4
	Appraisal Deadline Management	4
8	Employee Feedback Input	5
	Collection of Appraisal Feedback	5
	Employee Feedback	5
	Download Excel Document with Detailed Final Ratings for All Employees	4
	Download PDF Document of Employee Performance Appraisal Data	4
	Help Center	5

Daily Scrum

During the daily scrum process, a meeting is held to discuss the work to be done according to the established sprint backlog. The daily scrum process takes place every day at 10:00 AM local time. In its implementation, the HRIS team provides a progress report on previous work and determines the development plan for the next 24 hours.

Sprint Review & Retrospective

During the sprint review stage, an evaluation is conducted regarding the completed sprint backlog and the remaining work from the previous sprint review. Adaptation of the product backlog can be done during the sprint review process.

Results of the Employee Performance Appraisal System

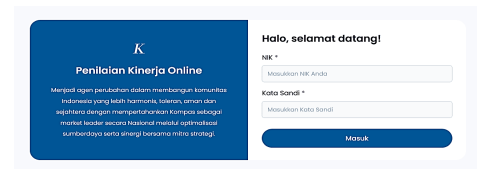Users can log in by entering their registered NIK (employee ID) and password into the system.

Fig 6. Login Page

Users with employee access will be directed to the Homepage after logging in. The Home page displays the approval status of employees and the structural team involved in performance appraisals.
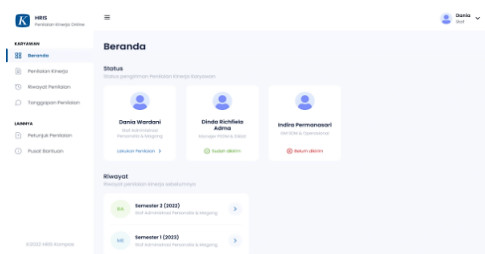

Fig 7. Employee Homepage

Performance Appraisal page shows detailed performance appraisal information and provides a button to submit the performance appraisal.
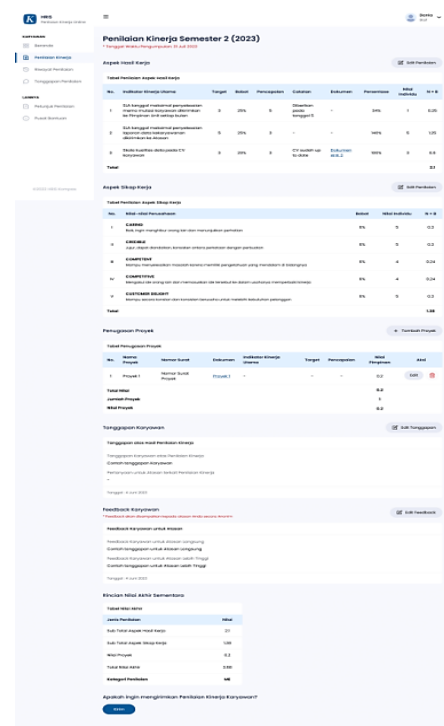

Fig 8. Performance Appraisal Page

Testing System

After the system has been built and developed, testing is conducted using the *Black Box* testing method to test the functionality and suitability of data and displays based on system requirements. The testing is carried out by Ms. Mareda Fenty Nugraheni Wijayati and Ms. Dania Wardani as supervisors of the HRIS team.

Table 3. System Testing Results

Feature	Input / Scenario	Expected Output	Result
Login	Login button	Homepage / Team Summary Page, success notification	Success
Employee Homepage	Page accessed	Performance appraisal submission status, previous performance appraisal history	Success
Performance Appraisal	Page accessed	Work results aspect table, work attitude aspect table, project assignment table, direct structural's response, Higher-level structural's response	Success
	Submit button	Back to Performance Appraisal page, success notification	Success
Team Summary	Page accessed	Statistical performance appraisal for the structural team, performance appraisal submission status for the structural team	Success
HR Summary	Page accessed	Overall performance appraisal statistics for the current semester, performance appraisal statistics by department	Success
Individual Work Plan Details	Page accessed	Individual work plan approval statistics, list of employees in the structural team	Success
	Approve button (HR)	Back to Individual Work Plan Detail page, success notification	Success
Unit Performance Appraisal	Print PDF button	Redirect / download employee's performance appraisal details in PDF format	Success
Final Performance Appraisal	Download Excel button	Download excel file containing performance appraisal details for all employees in a specific period	Success
Final Performance Appraisal Detail	Page accessed	Employee data, final grade details for the period	Success

Evaluation System

The system evaluation is done using Google Form with questions based on the five EUCS variables. It involves 19 permanent employees out of a total of 30 employees from the HRIS unit of Kompas who have tested the system. Acceptance percentage is calculated using the *Likert* scale.

Table 4. Jumlah per Variabel Kuesioner Evaluasi Sistem

Variabel	STS	TS	N	S	SS
Content	0	0	2	27	28
Accuracy	0	0	4	29	24
Format	0	0	6	22	29
Ease of use	0	0	5	21	31
Timeliness	0	0	5	15	18

$$Pc = \frac{(28*5)+(27*4)+(2*3)+(0*2)+(0*1)}{3*5*19} * 100\% = 89.12\%$$

$$Pa = \frac{(24*5)+(29*4)+(4*3)+(0*2)+(0*1)}{3*5*19} * 100\% = 87.02\%$$

$$Pf = \frac{(29*5)+(22*4)+(6*3)+(0*2)+(0*1)}{3*5*19} * 100\% = 88.07\%$$

$$Pe = \frac{(31*5)+(21*4)+(5*3)+(0*2)+(0*1)}{3*5*19} * 100\% = 89.12\%$$

$$Pt = \frac{(18*5)+(15*4)+(5*3)+(0*2)+(0*1)}{2*5*19} * 100\% = 86.84\%$$

Based on the intervals on the Likert scale acceptance percentage, the results of calculating the acceptance percentage of all variables are grouped.

Table 5. Description of Variable Acceptance based on Likert Scale Intervals

Variable	Percentage	Explaination
Content	89.12%	strongly agree
Accuracy	87.02%	strongly agree
Format	88.07%	strongly agree
Ease of use	89.12%	strongly agree
Timeliness	86.84%	strongly agree

CONCLUSION

Based on the results of this study, it can be formally concluded that the design and implementation of the Employee Performance Evaluation System based on ERP, developed using the Scrum framework, has been successfully accomplished. The system's features were purposefully constructed to enhance the effectiveness and efficiency of the performance appraisal process. A total of eight development sprints were conducted in close coordination with the product owner, ensuring continuous feedback and iterative improvement throughout the system development life

cycle. System was evaluated through Black Box Testing conducted by two HRIS supervisors at PT Kompas Media Nusantara, yielding a 100% conformity rate between expected and actual outputs demonstrating the functional reliability of the system.

User satisfaction was assessed using the End User Computing Satisfaction (EUCS) method combined with the Likert scale, involving 19 respondents from the HRIS unit. The evaluation produced the following scores across five key dimensions: Content: 89.12%, Accuracy: 87.02%, Format: 88.07%, Ease of Use: 89.12%, Timeliness: 86.84% These results collectively indicate that the system was well-received and positively evaluated by its end users, thus confirming its practical acceptability and effectiveness in supporting employee performance assessments within the organization.

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