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Analysis Of Implementation of Investment Governance Application (Sinusa) In the Nusantara Group Plantation Environment

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Abstrak

Penelitian ini bertujuan untuk menganalisis dan merancang pengembangan sistem aplikasi terintegrasi guna meningkatkan tata kelola investasi di lingkungan PT Perkebunan Nusantara Group (PTPN Group). Permasalahan utama yang dihadapi meliputi rendahnya tingkat realisasi investasi, proses pengelolaan investasi yang belum terintegrasi secara menyeluruh mulai dari tahap perencanaan hingga evaluasi, serta pemanfaatan sistem dan perangkat pendukung pengambilan keputusan strategis yang masih belum optimal. Oleh karena itu, dikembangkan Aplikasi SINUSA (Sistem Integrasi Tata Kelola Investasi) berbasis teknologi informasi dengan arsitektur web yang mampu mengintegrasikan data investasi secara real-time. Metode PIECES digunakan untuk menganalisis sistem dari enam aspek utama, yaitu kinerja (Performance), informasi (Information), ekonomi (Economics), pengendalian (Control), efisiensi (Efficiency), dan layanan (Service). Hasil analisis menunjukkan bahwa Aplikasi SINUSA mampu mempercepat proses pemantauan dan pelaporan investasi, meningkatkan akurasi informasi, serta mendukung efisiensi operasional dan efektivitas pengambilan keputusan. Selain itu, sistem ini juga meningkatkan transparansi dan pengendalian internal, serta memperkuat kolaborasi antar unit kerja melalui integrasi lintas departemen. Dengan demikian, pengembangan Aplikasi SINUSA memberikan dampak signifikan dalam meningkatkan pengelolaan investasi di PTPN Group. Implementasi aplikasi ini diharapkan dapat mendukung transformasi digital perusahaan serta meningkatkan akuntabilitas, responsivitas, dan keberlanjutan dalam pengelolaan investasi jangka panjang.

Kata Kunci: Tata Kelola Investasi; Aplikasi SINUSA; PIECES; Transformasi Digital; PTPN Group

Abstract

This study aims to analyze and design the development of an integrated application system to improve investment governance within PT Perkebunan Nusantara Group (PTPN Group). The main issues identified include the low realization rate of investments, the lack of integration across investment management processes from planning to evaluation, and the suboptimal use of systems and tools to support strategic decision-making. To address these issues, a web-based application system called SINUSA (Integrated Investment Governance System) was developed to manage and integrate investment data in real time. The PIECES framework Performance, Information, Economics, Control, Efficiency, and Service was used to evaluate the system from multiple critical aspects. The analysis revealed that SINUSA enhances the speed of investment monitoring and reporting, improves the accuracy of information, and supports operational efficiency and effective decision-making. Furthermore, the system promotes

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transparency and internal control, while strengthening collaboration across departments through integrated data access. In conclusion, the development of the SINUSA application has a significant impact on improving investment management at PTPN Group. Its implementation is expected to support the company's digital transformation and enhance accountability, responsiveness, and sustainability in long-term investment governance.

Keywords: Investment Governance; SINUSA Application; PIECES; Digital Transformation; PTPN Group

1. Introduction

PT Perkebunan Nusantara (PTPN) is a State-Owned Enterprise (BUMN) engaged in the plantation sector, with main commodities including palm oil, rubber, tea, and coffee. As a business entity that plays a strategic role in the national economy, PTPN is committed to implementing the principles of Good Corporate Governance (*GCG*) in all operational aspects, including in investment management.

However, the effectiveness of investment management in PTPN's environment over the past five years is considered less than optimal. This is reflected in financial performance indicators such as *Return on Invested Capital* (ROIC), *Return on Assets* (ROA), and *Return on Equity* (ROE) which show lower results compared to similar companies (*peers*) in the plantation industry.

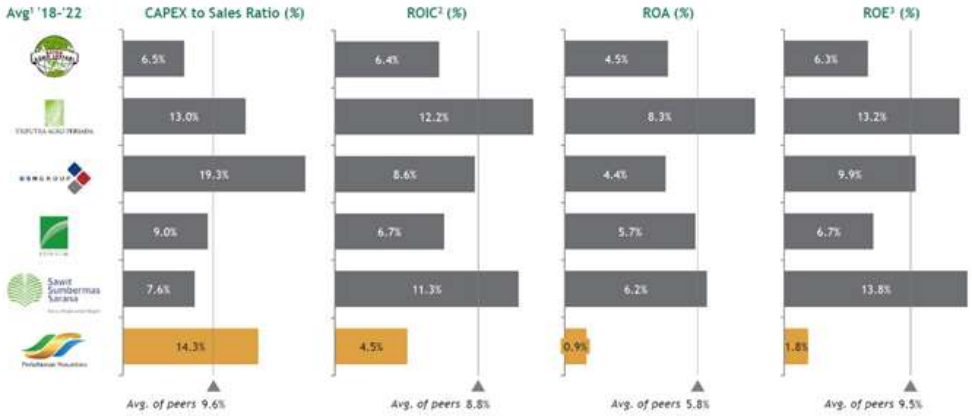


Figure 1. Benchmark Comparison Data

Figure 1 shows the low achievement of PTPN's financial performance indicators, which are reviewed through the following key metrics:

1. *Return on Invested Capital* (ROIC)
   ROIC measures the extent to which an investment is able to generate added value compared to the cost of capital incurred. A low ROIC value indicates that the investment has not provided significant returns, or there is inefficiency in the use of capital.
2. *Return on Assets* (ROA)
   Low ROA indicates that the company's assets have not been optimally utilized in generating revenue. In the context of the plantation industry, where assets such as land, factories, and equipment have strategic value, low ROA can reflect a low level of operational efficiency.

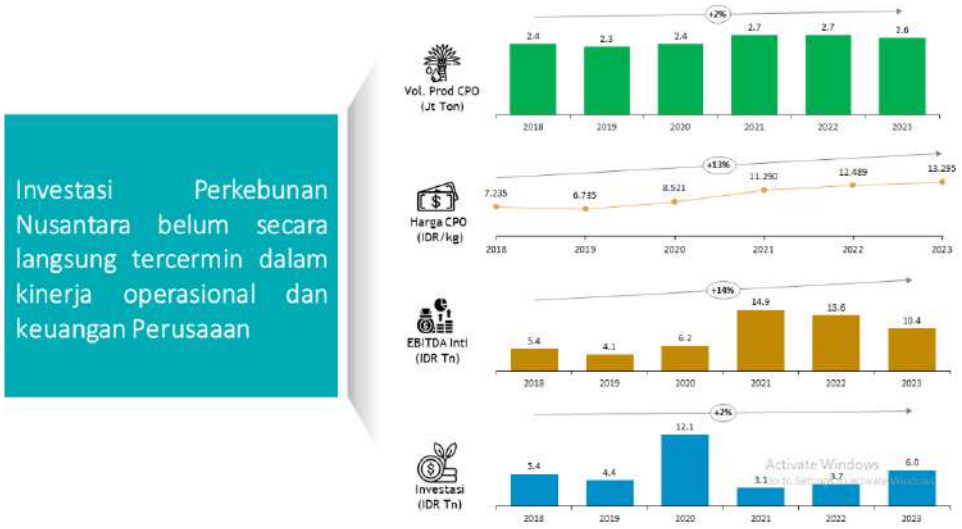


Figure 2. PTPN Group investment has not been reflected

This is due to suboptimal investment management, as well as low investment realization rates, which are influenced by incomplete processes and the lack of synchronization of investment timelines with other functions. In addition, there is no specific function that comprehensively and periodically manages investments, and systems and devices (*tools*) that have not been effectively integrated. Based on the identification results, there are a number of main pain points that cause suboptimal investment implementation in the Perkebunan Nusantara Group environment, which can be categorized into three main pillars as follows:

1. *People*
   There are no dedicated human resources available to carry out investment management in a comprehensive, integrated and sustainable manner, both in terms of planning, execution and evaluation.
2. *Process*
   The investment management process has not been carried out *end to end* , where there is no synchronization between investment planning and operational, financial and procurement functions, thus hampering effective and timely execution.
3. *Tools and systems*
   The use of systems and tools in investment management is not yet optimal, both in terms of data integration, reporting, and real-time monitoring of investment performance.

investment management should be reflected in the company's financial performance, which can be measured through indicators such as Return on Assets (ROA), Return on Invested Capital (ROIC), and Return on Capital Employed (ROCE). However, investment management at Perkebunan Nusantara Group is considered less than optimal, as reflected in financial performance that is not comparable to similar companies (benchmark), as well as the increasing trend of asset impairment that occurred during the period 2019 to 2021.

The results of benchmarking conducted on other state-owned companies, such as PT PLN (Persero) and PT Bank Mandiri Tbk, show that a system or tool is needed to support the investment management process the following

stages:
1. Planning
2. Implementation
3. Monitoring
4. Evaluation
5. Reporting
6. Fast, efficient and accurate dashboard visualization

This also includes centralized and integrated management and storage of investment data.

Currently, the implementation and monitoring of investment in the Perkebunan Nusantara Group environment still faces various obstacles, both in terms of human resources (*people*) and system and tool support (*tools*). The complexity of investment management is increasing due to the diverse types of investments, spread out, and having different characteristics in each Subsidiary. Therefore, a solution is needed that utilizes information technology to simplify the process and increase the effectiveness of investment management in line with the company's future development. Therefore, a study is needed that can comprehensively examine the effectiveness of investment management currently being carried out and the urgency of strengthening information technology-based support systems. The research questions raised in this study are as follows:
1. How is the investment management performance of Perkebunan Nusantara Group when viewed from the ROA, ROIC, and ROCE indicators, and how does it compare with similar companies (benchmark)?
2. Why does Perkebunan Nusantara Group need an integrated investment management support system, from planning to reporting?
3. What are the main obstacles in implementing and monitoring investments in the Perkebunan Nusantara Group environment, and what is the role of information technology in overcoming these obstacles?

Thus, Perkebunan Nusantara Group requires an integrated and *real-time system design* that to support comprehensive investment governance. The results of this system development will be analyzed using the PIECES *framework approach* (*Performance, Information, Economics, Control, Efficiency, and Service*) to evaluate the impact and quality of the proposed system.

II. Review Library

1. *Investment* Governance

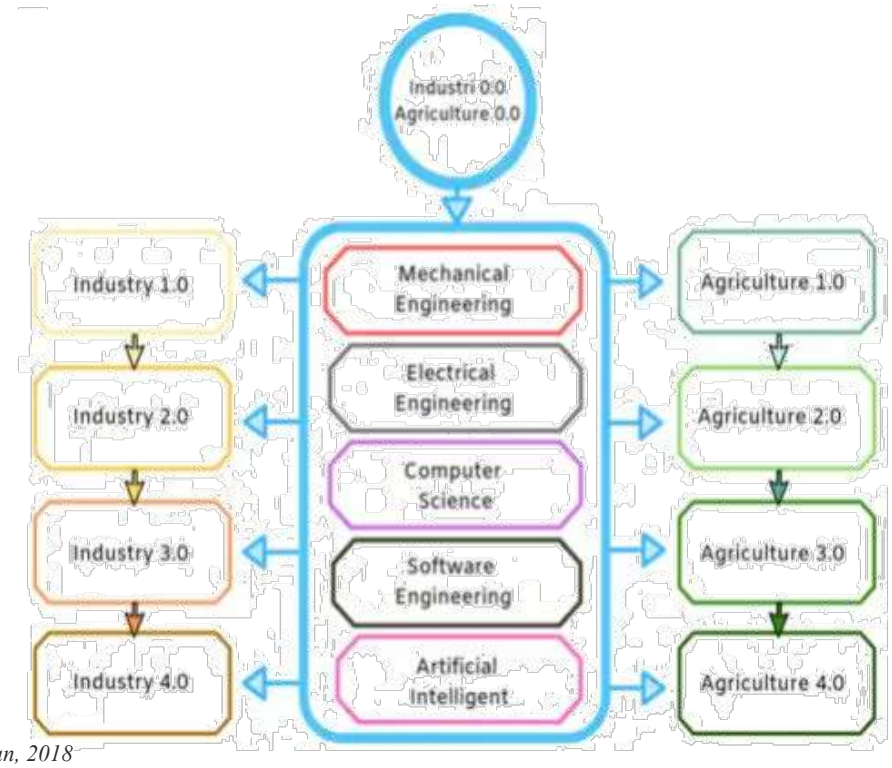
The development of appropriate and targeted technology is a priority in completing projects related to information technology, but often these development projects do not match expectations, and many information technology development projects fail or are canceled midway. This is because information technology development investments are not well planned. Information technology development investments are difficult to assess with mathematical calculations because the benefits of information technology development have two different aspects, namely tangible benefits *and* intangible benefits.

2. Management Information *System*

"Management Information Systems are planned and organized approaches to supplying executives with intelligence aids that facilitate the managerial process." (Heyel, p. 134) (Management information systems are planned and organized approaches to provide standard assistance that facilitates the managerial process to top officials). The components of a computer-based information *system are hardware, software, databases, telecommunications, and humans. If a computer-assisted information system does not have human resources* , the management information system will not be able to run according to the previously established plan. (Ketut, et al. 2022).

3. Digital Transformation in the Plantation Industry

The stages of oil palm plantation development from a technological perspective have developed from increasing productivity to increasing high added value through innovation. This development supports the development of a sustainable palm oil industry. The industrial revolution 4.0 has an impact on the agricultural sector, including oil palm farming. Digitalization and technology based on Industry 4.0 can be applied in agriculture (Agriculture 4.0). The development of oil palm cultivation methods from Sawit 1.0 to Sawit 4.0 shows the evolution in the palm oil industry. Technological innovations such as Sawit 3.0 have had a major impact on plantation business actors. (PASPI Journal 2023)



Source: *Tekinerdoğan, 2018*

Figure 3. Development of Industrial Production Methods Following Digital Transformation

4. Nusantara Investment System (SINUSA)

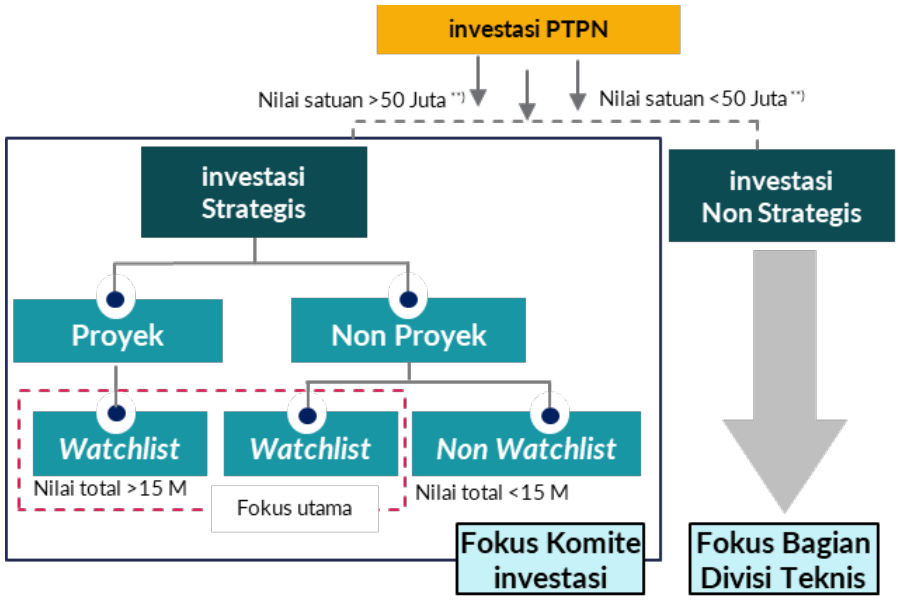
Nusantara Investment System (SINUSA) is a system that can manage resource usage activities in order to increase and maintain company value. The implementation and monitoring of investment in the PTPN Group environment is still an obstacle both in terms of *people* and *tools* . PTPN Group has many types of investments with various categories from several Subsidiaries so that it requires convenience that is in line with the development of the company based on Information Technology. Some of the obstacles faced and need attention include;

a. Data input is still carried out manually via *Microsoft Excel* / *Google Spreadsheet* .
b. Database storage on each personnel's *local computer which is not yet centralized.*
c. The validity of the investment input data is considered still lacking, where changes and corrections to data are still made manually and there is no *record tracking available* if there is a change in data, so that when compiling the planning, it is not visible if there is a change in investment planning.

d. *The output data from the dashboard* visualization is still not *real time and does not contain high-level* information regarding investment stages within the PTPN Group.

5. *Grand Design* Investment Planning

Filtering parameters to ensure that investment criteria are met The proposed investments are very diverse and are expected to be adjusted to the company's needs and financial capabilities as seen in *the flow diagram* below.



Source: PTPN

Figure 4. *Grand Design* of PTPN Investment Planning

III. Method

PIECES (Performance, *Information and Data, Economics, Control and Security, Efficiency, Service*) is a framework method used to measure the value of the variables applied and the quality of service of an application. PIECES *framework* is a framework used to classify an opportunity, and direction. problems , The stages in this method are as follows:

a. *Requirements* Analysis

Identify system requirements from the user side, investment business processes, and data integration needed to

support the overall application function.

b. *System Design*
Designing the system structure and application workflow, including database design, user interface, and the main modules to be developed.

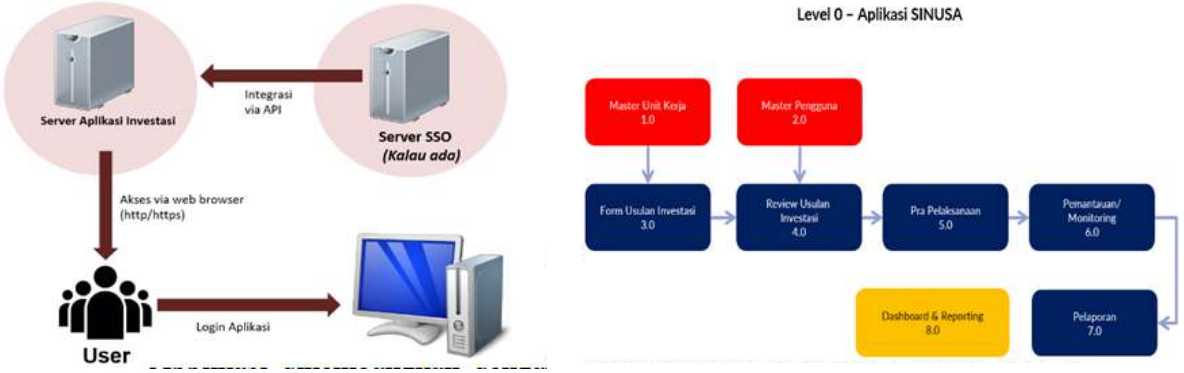
c. Implementation (Coding*)*
Java programming language programming codes with an IDE (Integrated *Development Environment*) that uses an API (application *programming interface*) to communicate with the server.

d. Testing
Conduct system testing (unit tests, integration tests, and user acceptance tests) to ensure that the system runs according to specifications, is free from functional errors, and is responsive to user needs.

e. *Deployment*
Implementing the system into a limited operational environment (e.g. investment division), as well as conducting training to initial users.

f. *Maintenance*
Provides post-implementation system maintenance support, including bug fixes, feature updates, and customizations based on user feedback.

Based on the results of primary and secondary data collection that has been carried out, the next step is business process modeling to comprehensively describe how the investment management flow takes place in the Perkebunan Nusantara Group environment. From the business process modeling, various main functionalities that are needed and have been accommodated in the development of the investment application system can be identified. This functionality covers various stages in the investment management cycle, from planning to reporting. As a visual representation, the investment application architecture and conceptual use case diagrams are arranged to show the relationship between user actors and the main features or services of the system. This modeling is outlined in *the Use Case* Diagram shown in Figure 4.1 below.



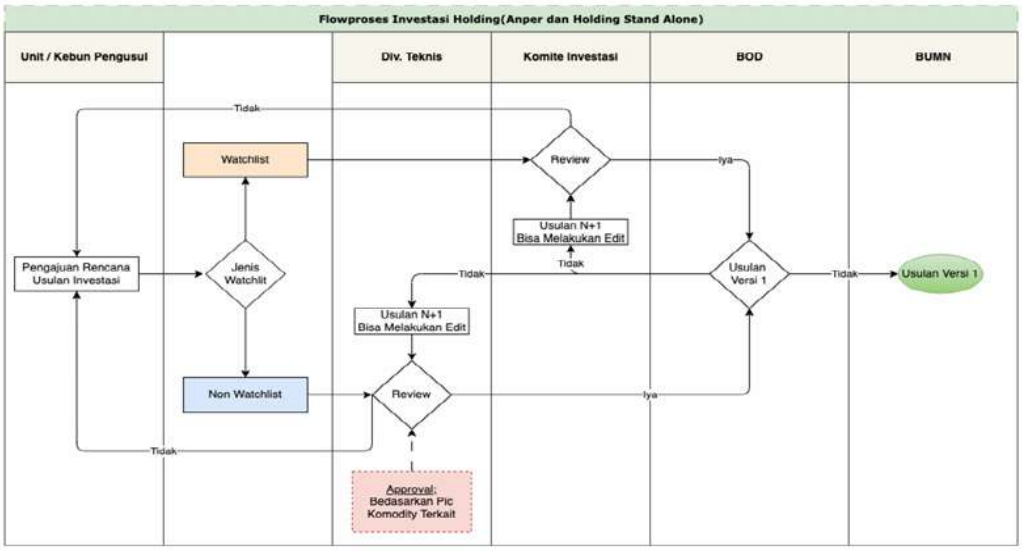
Source: PTPN Data, SINUSA System

Figure 5. Application Architecture and Conceptual

IV. Results and Discussion

Nusantara Investment Information System (SINUSA) is an application designed to support structured and

integrated investment governance within the PTPN Group. In the early stages of its development, SINUSA has been equipped with various functional modules and user access rights settings based on roles (role-based access control). To provide a clearer picture, the flowchart of the investment planning process at the Holding level is presented in Figure 6.2 below.



Source: PTPN Holding Data

Figure 6. Flowchart of Holding Investment Planning

These improvements are supported by key performance indicators (KPIs), such as average processing time, data accuracy rates, system utilization levels, and user satisfaction scores, which were measured by comparing baseline conditions one year before implementation with performance outcomes one year after full system deployment.

To be able to login to the Nusantara SINUSA Investment Information System application, users can access the link https://komite-investasi-dev.holding-perkebunan.com:8443/ . After logging in, users will be directed to **the dashboard page** as the initial display of the application. The following is an explanation of the main appearance and features of the SINUSA dashboard:

To assess the extent to which the SINUSA application design is effective in improving efficiency and investment governance in the Perkebunan Nusantara Group environment, an evaluation approach is used that includes quantitative and qualitative analysis. This approach aims to evaluate both the functional aspects of the system and its impact on the organization's business processes.

Source: PTPN Holding Data

Figure 7. *Login to* the SINUSA Application

1. Comparison of Conditions Before and After Implementation

The effectiveness of the system can be measured by comparing key performance indicators (KPIs) between the periods before and after the implementation of the SINUSA application. Some of the quantitative metrics used include:

a. **Investment application processing time**
   - before : done manually through physical documents and conventional coordination.
   - After: automated in the system, with faster and more transparent digital flows.

b. **Number of investment data input errors** (data *entry errors* can be reduced due to automatic validation)
   - Before: Common errors occurred due to manual input and formatting inconsistencies.
   - After: Automatic validation system reduces the number of data errors.

c. **Frequency of coordination between units**
   - Before: coordination was mostly done through physical meetings and informal communication.
   - After: digitized through system features and automatic notifications.

d. **Number of investment projects realized according to plan**
   - **Before: many projects were delayed or did not go according to plan.**
   - **After: more structured planning and monitoring processes support more accurate realization.**

baseline data is taken from a period of one year before implementation, and compared with data one year after full implementation. This comparison will provide a direct picture of the improvement in performance and efficiency of the investment process. It is also shown in Table 1. below .

Table 1. Comparison of Conditions Before and After Implementation

No.	Performance Indicators	Conditions Before Implementation (Manual)	Condition After Implementation (With SINUSA)	Evaluation Method
1	Investment application processing time	A long and layered process	Faster because it is automatic and structured	Average processing time (days/hours)
2	Number of investment data input errors	High, manual input without validation	Low, the system has automatic validation	Number of error entries/month
3	Frequency of coordination between units	Many offline meetings	Coordination via system (chat/task tracking)	Number of coordination meetings per month
4	Number of investment projects realized according to plan	Many delays or not realized	More controlled and according to timeline	Percentage of projects realized on time
5	Investment data access speed	Difficult and requires manual search	Fast and centralized data access	Average data search time
6	Availability of investment reports	Reports are prepared manually, which takes time.	Automatic and real-time reporting	Frequency and timing of report creation
7	Transparency and accountability of the investment process	Hard to track, not clearly documented	Clearly recorded in the system, auditable	Number of documented audit trails
8	System user satisfaction (user experience)	Many complaints, manual system is not flexible	Increased satisfaction due to user-friendly system	User satisfaction survey scores
9	Number of revisions to investment documents or proposals	High, due to non-standardized processes	Lower due to templates and automated flows	Number of document revisions/month
10	System utilization rate by related units	Low because it is not centralized	High because the system is the main platform	Percentage of units actively using the system

2. Use of Success Indicators (Key Performance Indicators – KPI)

The success indicators used to assess system effectiveness can be divided into several categories as follows.

Table 2. Success Indicators

Category	Indicator
Process Efficiency	Average processing time for investment applications
Accuracy and Validity	Percentage of data that passes automatic validation without manual correction
Investment Realization	Percentage of investments realized on time and according to plan
User Performance	Number of daily/weekly/monthly active users
User Satisfaction	User satisfaction survey score
ROI System	Comparison of implementation costs with benefit value (efficiency & outcome)

These KPIs can be collected through system logs, financial reports, as well as user survey results and routine monitoring reports.

V. Conclusion

The empirical analysis of financial performance indicators, including Return on Assets (ROA), Return on Invested Capital (ROIC), and Return on Capital Employed (ROCE), indicates that the investment performance of the PTPN Group remains below industry benchmarks. This condition reflects inefficiencies in investment planning, monitoring, and inter-unit coordination, which empirically justifies the need for an integrated investment governance system supported by information technology.This study successfully analyzed and evaluated the development of the SINUSA Application as an integrated system in investment governance in the Perkebunan Nusantara Group environment. This Information Technology-based application has proven to be able to answer the company's needs for a more efficient, transparent, and accountable system in supporting investment management.

1. Investment Performance and the Urgency of Integrated Systems
   The results of the analysis of financial indicators, namely ROA (Return on Assets), ROIC (Return on Invested Capital), and ROCE (Return on Capital Employed), show that the level of return on investment of PTPN Group is still below the average of similar industries. This finding indicates inefficiency in planning, monitoring, and coordination between work units, and strengthens the urgency of the need for an integrated system that is able to support real-time and data-based planning and evaluation.
2. SINUSA Application Contribution in Investment Management
   System development through the SINUSA Application has provided digital tools that support the entire investment cycle, starting from:
   a. planning
   b. implementation
   c. monitoring
   d. evaluation
   e. reporting
3. Based on a comparison of conditions before and after implementation, the SINUSA Application demonstrates measurable improvements in investment governance processes. These improvements include reduced investment application processing time through automated workflows, decreased data input errors due to system validation features, improved coordination efficiency across units via digital notifications, and an increased percentage of investment projects realized according to the planned timeline:

a. automatic validation
b. system notification
c. inter-unit API integration
d. interactive visualization *dashboard*

These features support management in accessing information quickly and accurately, and facilitate comprehensive investment performance analysis.

4. Impact Evaluation Based on PIECES Framework

The evaluation results using the PIECES framework (Performance, Information, Economics, Control, Efficiency, Service) show that the SINUSA Application:

a. simplify workflow
b. reduce manual processes
c. increase the speed of information flow
d. improve the quality of data-based decision making
e. ensure the security and control of investment data

Therefore, this study empirically confirms that the SINUSA Application delivers not only conceptual system benefits but also quantifiable improvements in investment governance performance. The findings indicate that SINUSA strengthens transparency, operational efficiency, and data-driven decision-making, making it a strategic digital governance tool to support long-term investment management and organizational performance within the PTPN Group.

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