

THE ROLE OF LEADERSHIP MODERATION ON FIXED ASSET MANAGEMENT SYSTEMS

O PAPEL MODERADOR DA LIDERANÇA NOS SISTEMAS DE GESTÃO DE ATIVOS IMOBILIZADOS

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Abstract

This study aims to analyze and demonstrate how HR competency, internal control systems (ICS), and asset information technology influence the effectiveness of fixed asset management. Furthermore, it explores leadership's moderating role in the relationship between these three variables and fixed asset management effectiveness at Cenderawasih University. This study adopted a quantitative approach utilizing a survey method. Through questionnaire distribution, employing a purposive sampling technique, 150 employees directly involved in the fixed asset management process were sampled. This process includes planning, procurement, use, maintenance, security, utilization, assessment, disposal, administration, coaching, control, and supervision. The collected data were then analyzed using Structural Equation Modeling. The results empirically demonstrate that HR competency, ICS, and asset information technology partially influence the effectiveness of fixed asset management. Leadership, on the other hand, is proven to strengthen the influence of competency and information technology utilization on the effectiveness of fixed asset management.

Resumo

Este estudo tem como objetivo analisar e demonstrar como a competência dos recursos humanos, os sistemas de controle interno e a tecnologia da informação aplicada aos ativos influenciam a eficácia da gestão de ativos imobilizados. Além disso, investiga-se o papel moderador da liderança na relação entre essas três variáveis e a eficácia da gestão de ativos imobilizados na Universidade de Cenderawasih. O estudo adotou uma abordagem quantitativa, utilizando o método de levantamento (survey). Por meio da aplicação de questionários, com a utilização da técnica de amostragem intencional (purposive sampling), foram selecionados 150 funcionários diretamente envolvidos no processo de gestão de ativos imobilizados. Esse processo abrange as etapas de planejamento, aquisição, uso, manutenção, segurança, aproveitamento, avaliação, alienação, administração, capacitação, controle e supervisão. Os dados coletados foram analisados por meio da Modelagem de Equações Estruturais. Os resultados demonstram empiricamente que a competência dos recursos humanos, os sistemas de controle interno e a tecnologia da informação aplicada



However, the interaction between leadership and the ICS showed no significant effect.

Keywords: Competence, Fixed Asset Management, Information Technology, Internal Control Systems, Leadership.

aos ativos influenciam parcialmente a eficácia da gestão de ativos imobilizados. A liderança, por sua vez, mostrou-se capaz de fortalecer a influência da competência e da utilização da tecnologia da informação sobre a eficácia da gestão de ativos imobilizados. No entanto, a interação entre liderança e sistema de controle interno não apresentou efeito significativo.

Palavras-chave: Competência. Gestão de Ativos Imobilizados. Tecnologia da Informação. Sistemas de Controle Interno. Liderança.

1 INTRODUCTION

As a higher education institution in Eastern Indonesia, Cenderawasih University holds a dual strategic role: not only providing education but also serving as a crucial pillar in achieving good governance. As a public institution and an extension of the government in the regional higher education sector, the university is responsible for practicing transparency and accountability in public financial management. This responsibility forms a foundation for sustainable development and builds public trust, particularly in Papua. This is especially evident in the management of fixed assets, which, according to SANDU; VARGANOVA; SAMII (2022), are a key element reflecting an organization's resources. Therefore, accountable management is a vital indicator of financial performance.

With its transformation into a Public Service Agency State University, the demand for optimal asset management is increasingly pressing to support financial flexibility and boost non-tax state revenue. However, in practice, universities still face complex challenges. These include unaccounted fixed assets, the absence of asset ownership documents, assets controlled by third parties, disorganized fixed asset administration, and weak asset write-off and reclassification systems (THE AUDIT BOARD OF INDONESIA [BPK RI], 2022). A similar phenomenon has occurred at Cenderawasih University, characterized by fixed asset write-offs not balancing procurement, weak coordination with relevant agencies, suboptimal human resources for asset management, and the lack of an integrated asset information system. These challenges clearly align with agency theory, which describes the potential for conflicts of interest and information asymmetry between asset managers and resource owners. Weak control and transparency

systems can hinder accountability in asset management. Therefore, efforts to strengthen fixed asset governance by implementing good governance principles are not merely an operational imperative but also a commitment to Cenderawasih University's accountability as a public higher education institution in Eastern Indonesia.

Based on these challenges, this researcher proposes several internal organizational factors believed to influence the effectiveness of asset management. These include human resource competency, internal control systems (ICS), and the utilization of information technology. The aim is to encourage the implementation of asset governance in accordance with applicable regulations, ensuring it is effective, efficient, transparent, and accountable, thereby forming a framework for good university governance. If human resource competency improves, ICS are optimized, and information technology is adequately implemented for asset management, asset management will become more effective.

This perspective is reflected in the substance of stewardship theory, which rests on the assumption that stewards will act in line with the principal's interests because they feel ownership and responsibility for the resources they manage (HSU & ZHANG, 2025; JIDE; ABDULRASHEED; LEKE, 2025). This suggests that human resources managing State Property will act in accordance with the organization's interests, feeling ownership and responsibility for these assets. Given the urgency of building trust and accountability between stewards and principals, stewards are obligated to be responsible for the use and maintenance of state assets. They are required to demonstrate how fixed assets are properly managed, where they are used, and their impact on Cenderawasih University's performance. Therefore, the need for higher competencies is an integral part of the stewardship relationship at Cenderawasih University, enabling human resources to manage fixed assets more effectively.

On the other hand, KHANDELWAL *et al.* (2023) and ZHAO & SHI (2024) state that agency theory explains the contractual relationship between asset owners and managers responsible for organizational assets. This theory posits a potential for conflicts of interest between agents and principals. In fixed asset management, managers may be incentivized to use assets for personal gain, even if this is detrimental to the organization. Therefore, an ICS implemented through procedures and policies, is crucial to mitigate the risks associated with such potential conflicts of interest and opportunistic behavior. Furthermore, in an agency relationship, agents often possess more information about the

assets under management than principals. Information technology allows transparent access to fixed asset data and information by both parties, thereby reducing uncertainty and increasing trust. By leveraging integrated information technology, organizations can mitigate conflicts of interest between management and principals, ensuring organizational assets are managed responsibly and generate maximum value.

This research distinguishes itself through its model. Similar to previous studies by NAOMI & HADIPRAJITNO (2023) and YULIANTI; ANDAYANI; GHOFAR (2024), earlier research proposed a direct relationship model between HR competency, ICS implementation, and information technology utilization on the effectiveness of fixed asset management. This study, however, adds leadership as a contingency variable expected to strengthen this relationship. Previous research by AZHAR; FAJRIAH; DHAMAYANTI (2022), JOHARI *et al.* (2022), and ZHENG *et al.* (2020) has shown that leadership can positively moderate the relationship between employee competency and performance. Similarly, MAHMUD *et al.* (2024) found that leadership quality can strengthen the relationship between ICS and financial management, particularly in income-generating management. Previous studies have indicated that leadership supports functions as a moderating variable influencing the relationship between technological advancement and sustainable performance. This suggests that leadership is an appropriate moderating variable in the present study, as it can either strengthen or weaken the interaction among human resource competencies, ICS, and information technology utilization, thereby affecting the effectiveness of fixed asset management.

Thus, leadership plays a key role in optimizing transparency and accountability in fixed asset management within universities, an integral part of public financial management (GABRIEL & WILLS, 2024). It also serves as a crucial foundation for strengthening ICS, which ensure compliance, reporting reliability, and asset operational effectiveness (NDONWI *et al.*, 2025). Furthermore, leadership fosters the integration of information technology as an organizational backbone, ensuring transparency and efficiency in asset management, and facilitating an integrated, accurate, and accessible fixed asset reporting system that ultimately supports public accountability.

This study aims to examine the influence of competence, ICS, and information technology utilization on fixed asset management effectiveness. It specifically posits leadership as a moderating variable, expected to influence the relationship between these three factors and fixed asset management outcomes. The theoretical contributions of this

study lie in its significant advancement of financial management and human resource management literature, particularly within the context of fixed asset management in a university setting. This research enriches theoretical understanding by integrating stewardship theory and agency theory. Drawing on stewardship theory, university leaders are conceptualized as stewards responsible for optimizing organizational asset utilization for the common good through participatory leadership, adequate competence, and the effective deployment of information technology. Concurrently, agency theory emphasizes the critical role of monitoring mechanisms and ICS in minimizing potential conflicts of interest between leaders and stakeholders. By integrating these two theoretical perspectives, this study offers a more comprehensive understanding: effective fixed asset management is attainable through responsible leadership, the implementation of robust ICS, and the strategic utilization of information technology to enhance institutional transparency and accountability.

2 LITERATURE REVIEW

2.1 Competence

Effective fixed asset management in an organization hinges on employees possessing adequate knowledge in their respective fields (HAPSARI *et al.*, 2025). NASEEM; MOHSIN; JAMIL (2025) and SIJBOM *et al.* (2025) assert that a high level of knowledge significantly enhances work quality and the ability to navigate complex tasks. Knowledge, alongside skills and attitudes, is a primary asset of human resource competency.

Several previous studies have examined the influence of ASSET competency on the effectiveness of fixed asset management, including those by NAOMI & HADIPRAJITNO (2023) and YULIANTI; ANDAYANI; GHOFAR (2024). Their findings consistently indicate that higher competency among fixed asset management employees correlates with greater effectiveness in fixed asset management. According to KART and S ŞİMŞEK (2024), within the competency concept, several indicators or benchmarks serve as the foundation for assessing employee performance in fixed asset management. Understanding reflects an employee's ability to grasp, comprehend, and master the meaning and significance of relevant work materials and processes. This is

followed by knowledge, which refers to the specific information possessed by employees to effectively carry out tasks and responsibilities aligned with their respective areas of work. Furthermore, skill represents an employee's capacity to perform assigned tasks both efficiently and creatively, thereby contributing to organizational effectiveness. Value encompasses the standards of behavior that have been internalized and psychologically integrated into an individual's identity, influencing every action taken in the work environment. Additionally, interest describes an employee's predisposition and willingness to engage in activities that support their learning and mastery of knowledge and skills essential for fixed asset management duties. Finally, attitude pertains to the behavioral patterns demonstrated by employees as they perform their responsibilities in compliance with the applicable organizational rules and regulations.

2.2 Internal Control System (ICS)

OVCHINNIKOVA and GREBNEVA (2020) define an ICS as a method for directing, monitoring, and measuring an organization's resources. This aligns with IGBOJIOYIBO (2024) and NDONWI *et al.*'s (2025) view, which describes it as a set of policies and procedures designed to safeguard assets from various forms of misuse, ensure accurate asset information, and guarantee that all organizational regulations are complied with and properly implemented by employees and management alike.

Several previous studies have explored the effect of ICS on the effectiveness of fixed asset management, including those by PAKPAHAN *et al.* (2023) and YULIANA; TAUFIK; NASRIZAL (2021). The results consistently demonstrate that ICS has a positive and significant impact on the effectiveness of fixed asset management. According to MULYADI (2023), the constructs or indicators of the ICS in this study serve as essential components for ensuring effective governance in fixed asset management. The internal control system requires a written description of the duties and authorities of staff, ensuring clear documentation of objectives, duties, authorities, and responsibilities for each work unit involved in managing fixed assets. The system also emphasizes the importance of the separation of authority, ensuring that internal control activities operate independently and remain distinct from the operational activities they evaluate. In addition, the ICS promotes the alignment of planning with the organization's vision and mission, ensuring that fixed asset procurement plans are consistent with

strategic objectives. Furthermore, the system requires alignment of planning with evaluation, meaning that the preparation of procurement plans must consider the evaluation results and performance achievements of the previous year. A structured risk assessment process is incorporated to identify sources of risk, potential risk events, causal factors, and possible consequences affecting fixed asset management.

The completeness of asset inventory is also essential, requiring adequate and reliable documentary evidence for the collection, recording, and reporting of fixed assets. Additionally, supervision of fixed asset usage ensures that all activities related to fixed asset management adhere to laws, regulations, organizational policies, and standard operating procedures. The ICS also ensures compliance of donated or exchanged assets with the Handover Report, confirming that asset transfers accurately match official documentation. Finally, the system includes the resolution of discovered weaknesses, referring to actions taken to address deficiencies identified during the internal control evaluation process and strengthen continuous improvement.

2.3 Utilization of Information Technology (IT)

Research by HAN; CHEN; ZHANG (2025) states that information systems comprise interrelated components that collect, process, store, and distribute information to support decision-making and reuse within an organization. The use of information systems influences the accuracy and precision of information acquisition, thereby enhancing the quality of asset management. Technological tools supporting information systems can also facilitate audits and performance control within government agencies. For instance, appropriate applications can significantly enhance organizational accuracy in asset management (AHMAD; KHAN; ISMAIL, 2023; ATTENCIA & MATTOS, 2022). Research by Gao (2024) demonstrates that the use of information systems technology has a direct impact on the management of fixed assets within an organization. The indicators of information technology utilization in this study refer to the model developed by THOMPSON; HIGGINS; HOWELL (1991). The diversity of software packages used describes the number of specialized software systems configured and implemented to support various fixed asset management activities in an organized and efficient manner. This diversity enables the optimization of workflows through integrated system functionality. Additionally, Intensity of use reflects the extent to which

individuals or organizations employ information technology in carrying out assigned tasks and responsibilities. A high level of usage intensity promotes behavior that integrates system-based asset and asset information, thereby facilitating more streamlined and accurate fixed asset management processes. The final asset, Frequency of use, measures how often and how long technology is utilized to support organizational operations. Increasing frequency over a given period signifies a growing dependence on technological tools to accelerate processes and enhance the effectiveness of fixed asset management.

2.4 Leadership

Leadership is the ability of an individual to influence, direct, and motivate organizational members to effectively achieve common goals. According to BAKER (2022), BENMIRA & AGBOOLA (2021), and HERMAWAN *et al.* (2022), leadership is the process of influencing others to understand and agree on what needs to be done and how to do it effectively. According to ALHMOUD & KASASBEH (2024), KESSI *et al.* (2025), and ZUAMA; SUDIARDHITA; WOLOR (2023), leadership plays a crucial role in coordinating human resources, control systems, and technology to create optimal organizational synergy. GUO *et al.* (2023) and TAJ (2023) emphasize that effective leadership encourages employee commitment to ethical standards and performance accountability, while SUBROTO; SAPTONO; EFFENDI (2024) state that transformational leadership can improve an organization's adaptability to changes in technology and control systems. Thus, leadership acts as a unifying factor, strengthening the integration of individual capabilities, systems, and technology to achieve efficient and transparent asset governance.

To achieve organizational objectives, SENGE (2006) highlights five key dimensions that leaders can apply as foundational benchmarks for organizational success. These dimensions emphasize the importance of facilitating access to learning opportunities, enabling employees to continuously develop both personal and professional hard and soft skills through independent and structured learning initiatives aligned with their areas of responsibility. Leaders are also expected to provide ongoing learning opportunities that equip employees with new knowledge and capabilities required to adapt to evolving organizational needs. Furthermore, leaders should serve as

coaches, mentors, and counselors, offering direction and motivation to assist employees in problem-solving and implementing effective follow-up actions. Another important dimension is the ability to clearly articulate a shared vision, ensuring that employees understand their roles and responsibilities and remain aligned in working toward common organizational goals. Equally essential is the effort to facilitate the distribution of innovative knowledge, including providing opportunities to explore and adopt the latest technological systems that enhance employee competence and work effectiveness. Sange (2006) also emphasizes the cultivation of collaborative work habits through the development of strong work teams in which members engage in dialogue, actively listen, and exchange perspectives to improve task completion. Leaders must also involve employees in building a shared vision, acting as role models who participate in learning activities, share insights, and apply learned lessons to enhance daily performance. In addition, success depends on ensuring transparent access to information related to work progress through well-developed information systems that support strategic decision-making. Finally, the establishment of an adequate, systematic, and integrated control environment is required to achieve organizational goals by ensuring reliable asset reporting, asset security, and compliance with laws and regulations through effective operational practices.

2.5 Hypotheses development

2.5.1 Leadership moderation in the influence of ASSET competence on fixed asset management

Research by UMAR; FIRMAN; OKTAVIANI (2023) demonstrated that competence by itself does not have a significant effect on employee performance. However, when leadership is introduced as a moderating factor, the relationship becomes positive and significant. Similarly, ASSET *et al.* (2022) successfully identified the moderating impact of organizational support on the relationship between professional competence and ASSET work effectiveness. ALKUWARI (2025) indicated that leadership is a key asset for measuring organizational support. Within organizational support, leader support can manifest as knowledge sharing (Chen, Chang, & Tian, 2025). Through the implementation of knowledge sharing by top managers, knowledge can be

disseminated, applied, and developed to achieve desired competency improvements (SWANSON *et al.*, 2020).

Related to this, AGUSTA & AZMI (2023) and SHUJAAT; RIAZ; YASMIN (2021) posit individualized consideration as a critical leadership dimension. This dimension involves leaders fostering employee skill and competency development, supporting career growth, actively listening to concerns, and understanding employee needs. The aforementioned theory and empirical findings suggest that leadership should be considered a moderating variable in this study, either strengthening or weakening the interaction between ASSET competency and employee work effectiveness in fixed asset management.

2.5.2 Leadership moderation on the impact of ics implementation on fixed asset management

A robust internal control system can enable higher education institutions to more effectively address asset challenges and operational demands, thereby ensuring high accountability in organizational asset management (MAHMUD *et al.*, 2024). Assets are a fundamental component of asset management, representing the resources owned and managed by an organization.

MAHMUD *et al.* (2024) explored the relationship between the internal control system and the asset management of higher education institutions. Their findings revealed that leadership quality serves as a moderating factor in this relationship, significantly influencing the effectiveness of income generation management. These results emphasize the critical role of strong leadership in enhancing the connection between internal control systems and sound asset management practices.

These findings suggest that this study warrants consideration of leadership as a moderating variable, capable of strengthening or weakening the interaction between the ICS and employee performance effectiveness in fixed asset management.

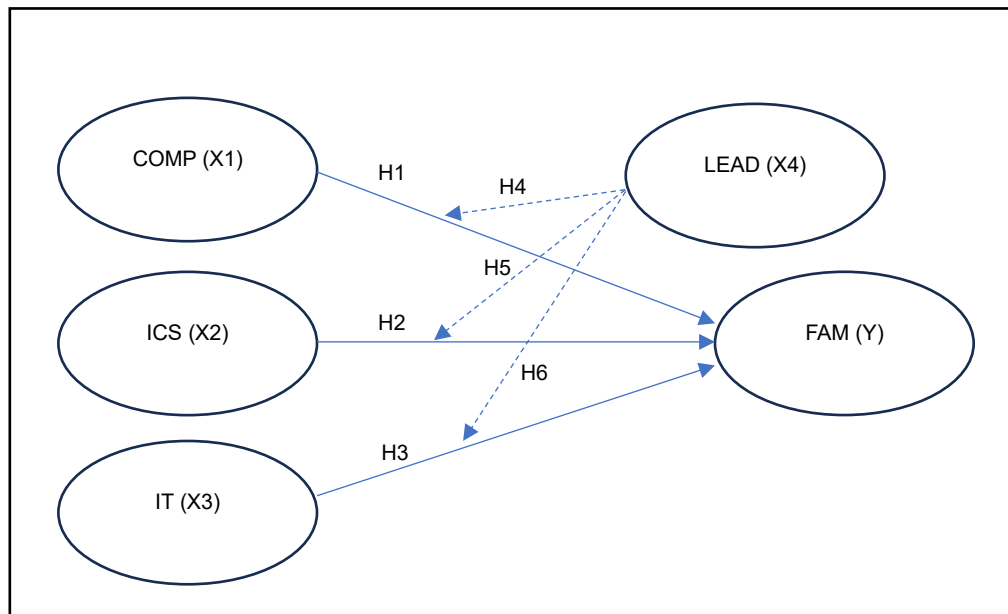
2.5.3 Leadership moderation in the influence of information technology utilization on fixed asset management

The concept of digital leadership is defined as a form of leadership that leverages information technology to achieve organizational goals. Digital leaders are those capable of utilizing IT to attain shared objectives within an organization. Digital leadership patterns can lead to behavioral consequences that shape habits in IT use, necessitating a systematic approach to networking among individuals/institutions to meet comprehensive information needs quickly, precisely, completely, accurately, and in an integrated manner.

Empirical evidence from previous studies indicates that leadership support plays a significant moderating role in the relationship between technological advancement and organizational performance outcomes. Leadership, particularly in the digital context, can influence how effectively management information systems and employee-related factors contribute to overall performance. In line with this theoretical perspective, the present study considers leadership as a potential moderating variable that may strengthen or weaken the interaction between information technology utilization and employee work effectiveness in fixed asset management.

2.6 Conceptual framework

The conceptual model (**Figure 1**) illustrates the hypothesized relationships between human resource competency (COMP), internal control systems (ICS), and information technology (IT) utilization on the effectiveness of fixed asset management (FAM). The leadership variable (LEAD) acts as a moderating variable that can strengthen or weaken these influences. The arrows in the model indicate the direct influence of competency, ICS, and information technology on the effectiveness of fixed asset management, as well as the moderation path that tests whether leadership influences the strength of these relationships. Thus, this model emphasizes the importance of managerial commitment in achieving effective asset governance.

Figure 1*Conceptual Framework*

H1: Competence (COMP) influences fixed asset management (FAM).

H2: ICS influences fixed asset management (FAM).

H3: Utilization of information technology (IT) influences fixed asset management (FAM).

H4: Leadership moderates (LEAD) the effect of competence on fixed asset management.

H5: Leadership moderates the effect of ICS on fixed asset management.

H6: Leadership moderates the effect of information technology utilization on fixed asset management.

3 METHODOLOGY

3.1 Research design

This research is explanatory in nature, aiming to explain the relationships between variables through hypothesis testing. The method used was an asset with a questionnaire instrument. The unit of analysis was the individual, namely, employees directly involved in fixed asset management at Cenderawasih University.

3.2 Population and sample

The research population comprised all 184 employees involved in fixed asset management activities, covering planning, procurement, utilization, maintenance, disposal, and supervision, across the Rectorate, Faculties, Bureaus, Institutions, and Technical Implementation Units (UPT). The sample was determined using a purposive sampling method, with the main criterion being employees directly engaged in asset management. Leadership positions were excluded to prevent bias, as leadership serves as one of the study's research variables.

The sample distribution in this study comprised respondents from both the Rectorate and various faculties within the university. A total of 25 respondents were drawn from the Rectorate, including employees from Goods and Services Procurement Working Group, the Bureau of Academic and Student Administration (BAAK), the Bureau of General Administration and Finance (BAUK), and the Bureau of Information Systems Planning and Cooperation Administration (BAPSIK). Meanwhile, 149 respondents were selected from multiple faculties, representing staff from the Administration, Finance, and Equipment Units; Academic Affairs; Heads of Departments and Study Programs; Heads of Computer Laboratories; and the Quality Assurance Unit. This group included 24 respondents from the Faculty of Teacher Training and Education, 20 from the Faculty of Social and Political Sciences, 24 from the Faculty of Economics and Business, 26 from the Faculty of Mathematics and natural Sciences, 11 from the Faculty of Public Health, 27 from the Faculty of Engineering, 9 from the Faculty of Sports Science, 4 from the Faculty of Law, and 4 from the Faculty of Medicine. Furthermore, 6 respondents originated from the Institutes of Research, Development, and Community Service (LPPM) and the Research and Development Institution (LPMPP), while 4 respondents were drawn from the Technical Implementation Units, including the Museum, Communication Center, Library, and Language Center.

The total sample comprised 184 respondents, meeting the SEM sample size requirement of 100–200 respondents for models with more than 20 indicators. This study adhered to ethical research standards by securing informed consent from all participants, maintaining confidentiality of their responses, and ensuring that the data collected were used solely for research purposes.

3.3 Data collection

Data were obtained through field research and a literature review. The field research employed three main techniques. First, questionnaires were distributed both offline and online, containing closed-ended questions measured using a Likert scale ranging from 1 to 5. Second, observations were carried out through direct visits to assess the actual conditions of asset management in practice. Third, semi-structured interviews were conducted with relevant officials, such as the Head of the Equipment Subdivision, to collect detailed information regarding the implementation, challenges, and solutions in asset management. The literature review complemented the field research by examining books, journals, reports, and previous studies related to leadership, competence, ICS, information technology, and asset management in higher education. This study involved five variables: the effectiveness of fixed asset management as the endogenous variable, and competence, ICS, information technology utilization, and leadership as the exogenous variables.

3.4 Data analysis

Data analysis was conducted using Structural Equation Modeling (SEM) based on Partial Least Squares (PLS) with the SmartPLS 4.0 application. PLS was selected due to its flexibility across various data scales, minimal assumptions, and suitability for small to medium sample sizes.

The analysis consisted of two stages: First, the outer model was evaluated to test the instrument's validity (both convergent and discriminant) using the following criteria: factor loading > 0.7 , Average Variance Extracted (AVE) > 0.5 , while the instrument's reliability was assessed using the following criteria: composite reliability > 0.7 , and Cronbach's alpha > 0.6 . Second, the inner model was assessed to examine the causal relationships among latent variables, with the R^2 value used to determine the proportion of variance in the dependent variable explained by the independent variables.

Hypothesis testing was conducted on the variables of competency, ICS, and information technology utilization on the effectiveness of fixed asset management, with leadership as a moderating variable. The structural model was tested through direct and moderated path analysis using interaction terms to examine the moderating effect of

leadership. The structural model was tested through direct and moderated path analysis, with the equation:

$$FAM = \beta^1 COMP + \beta^2 ICS + \beta^3 IT + \beta^4 COMP * LEAD + \beta^5 ICS * LEAD + \beta^6 IT * LEAD + \varepsilon \quad (1)$$

Hypothesis testing used a bootstrapping procedure with a 5% significance level. The hypothesis is accepted if the t-statistic value is > 1.96 or the p-value < 0.05 .

4 RESULTS

4.1 Reliability and validity

The data analysis of this study aims to examine the influence of competence, ICS, and the use of information technology on fixed asset management with leadership as a moderating variable. Data were processed using the Partial Least Squares – Structural Equation Model (PLS-SEM) method with the help of SmartPLS 4.0. An initial evaluation was conducted on the measurement model (outer model) to ensure that all research instruments were valid and reliable. Validity testing was carried out through convergent validity, where an asset is considered valid if it has a loading factor above 0.50. Furthermore, reliability was tested using Composite Reliability (CR) and Cronbach's Alpha, with a minimum criterion of 0.70. The Average Variance Extracted (AVE) value was also considered as an additional measure, with a minimum limit of 0.50.

Table 1

Factor Loading (OL), Cronbach's Alpha (CA), Composite Reliability (CR), and AVE for Each Measurement Variable

| Latent Variables | Code | FL | CA | CR | AVE | Result |
|-------------------------|------|-------|-------|-------|-------|------------------|
| Competence | X1.1 | 0.864 | 0.931 | 0.946 | 0.741 | Valid & Reliable |
| | X1.2 | 0.849 | | | | |
| | X1.3 | 0.847 | | | | |
| | X1.4 | 0.825 | | | | |
| | X1.5 | 0.897 | | | | |
| | X1.6 | 0.881 | | | | |
| Internal System Control | X2.1 | 0.805 | 0.932 | 0.946 | 0.645 | Valid & Reliable |
| | X2.2 | 0.820 | | | | |
| | X2.3 | 0.836 | | | | |

| | | | | | | | |
|-------------------------|------------|------|-------|-------|-------|-------|------------------|
| | | X2.4 | 0.794 | | | | |
| | | X2.5 | 0.838 | | | | |
| | | X2.6 | 0.780 | | | | |
| | | X2.7 | 0.744 | | | | |
| | | X2.8 | 0.805 | | | | |
| | | X2.9 | 0.801 | | | | |
| Information Utilization | Technology | X3.1 | 0.800 | 0.883 | 0.890 | 0.632 | Valid & Reliable |
| | | X3.2 | 0.819 | | | | |
| | | X3.3 | 0.768 | | | | |
| | | X3.4 | 0.803 | | | | |
| | | X3.5 | 0.750 | | | | |
| | | X3.6 | 0.825 | | | | |
| Leadership | | X4.1 | 0.811 | 0.951 | 0.955 | 0.717 | Valid & Reliable |
| | | X4.2 | 0.891 | | | | |
| | | X4.3 | 0.810 | | | | |
| | | X4.4 | 0.773 | | | | |
| | | X4.5 | 0.868 | | | | |
| | | X4.6 | 0.869 | | | | |
| | | X4.7 | 0.839 | | | | |
| | | X4.8 | 0.889 | | | | |
| | | X4.9 | 0.865 | | | | |
| Fixed Asset Management | | Y1 | 0.775 | 0.932 | 0.933 | 0.594 | Valid & Reliable |
| | | Y2 | 0.761 | | | | |
| | | Y3 | 0.802 | | | | |
| | | Y4 | 0.771 | | | | |
| | | Y5 | 0.792 | | | | |
| | | Y6 | 0.742 | | | | |
| | | Y7 | 0.748 | | | | |
| | | Y8 | 0.750 | | | | |
| | | Y9 | 0.761 | | | | |
| | | Y10 | 0.759 | | | | |
| | | Y11 | 0.812 | | | | |

Source: Data processing result using SmartPLS 4

The test results in **Table 1** for the competency variable (X1) showed that all six indicators were valid, with loading factors >0.50 . Furthermore, the CR (0.946), Cronbach's Alpha (0.931), and AVE (0.741) values were above the required standard, thus concluding that the competency variable measurement instrument was reliable and consistent.

For the ICS variable, measured by nine indicators, the analysis results also demonstrated good validity and reliability. All indicators had loading factors >0.50 , while the CR (0.946), Cronbach's Alpha (0.932), and AVE (0.645) met the criteria. This confirms that the SPI in this study was adequately measured by the questionnaire instrument used.

For the information technology utilization variable, measured by six indicators, the test results again demonstrated adequate consistency. The loading factor for each asset was greater than 0.50, the CR (0.890) and Cronbach's Alpha (0.883) values were above

0.70, and the AVE (0.632) was greater than 0.50. Therefore, the instrument used to measure IT is valid and reliable.

The leadership variable, measured by nine indicators, also showed similar results. All indicators were declared valid with loading factors >0.50 . The reliability results showed a CR (0.955), Cronbach's Alpha (0.951), and AVE (0.717), confirming that the leadership variable can be measured consistently with the research instrument.

Finally, the fixed asset management variable, measured using eleven indicators, showed satisfactory results. All indicators were valid, with the CR (0.933) and Cronbach's Alpha (0.932) values exceeding the minimum threshold of 0.70, while the AVE (0.594) was greater than 0.50. Thus, the questionnaire used in this study has been proven valid and reliable in measuring all research variables, so that it can be continued to the structural model analysis.

4.2 Structural model evaluation

Once the model meets the Outer Model criteria, the next stage is testing the Inner Model, or structural model. The Inner Model is developed from theory within a conceptual framework to analyze the influence of exogenous variables on endogenous variables. Evaluation is performed by examining the Coefficient of Determination (R^2), Predictive Relevance (Q^2), and Goodness of Fit (GoF).

Table 2

Goodness of Fit (GoF)

| | Saturated Model | Estimated Model |
|------------|-----------------|-----------------|
| SRMR | 0.064 | 0.065 |
| d_ULS | 3.540 | 3.615 |
| d_G | 2.078 | 2.099 |
| Chi-Square | 1468.353 | 1462.524 |
| NFI | 0.734 | 0.735 |

Source: Data processing result using SmartPLS 4

The Goodness of Fit (GoF) test is used to evaluate how well a model fits the observed data. Model fit can be measured using indicators such as the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Asset (NFI). According to Ghozali & Kusumadewi (2023), a model is considered to have a good fit when the SRMR value is below 0.08, and the NFI value is below 0.90.

The results in **Table 2** show that the SRMR was below 0.08, the d_ULS value exceeded 2,000, and the GFI was above 0.900, indicating that the model demonstrates acceptable fit based on descriptive criteria and that the relationships between constructs can be tested. Furthermore, the NFI value of 0.735, being close to 1, suggests a good model fit.

Table 3

Coefficient of Determination (R^2)

| | R Square | R Square Adjusted |
|------------------------|----------|-------------------|
| Fixed Asset Management | 0.559 | 0.538 |

Source: Data processing result using SmartPLS 4

Furthermore, the Coefficient of Determination (R^2) is used to determine how much the exogenous variables influence the endogenous variables. The R^2 assessment criteria are 0.75 (strong), 0.50 (moderate), and 0.25 (weak). The results in **Table 3** show an R^2 value of 0.559 for the Fixed Asset Management (PAT) variable, which is in the moderate category. This means that 55.9% of the variation in PAT is explained by the variables of competence, ICS, information technology utilization, and leadership, while 44.1% is influenced by other factors outside the model.

Table 4

Effect Size (f -square)

| Structural Model | f -square | Result |
|--------------------|-------------|--------------|
| 1 COMP → FAM | 0.103 | Small Effect |
| 2 ICS → FAM | 0.060 | Small Effect |
| 3 IT → FAM | 0.425 | Large Effect |
| 4 LEAD → FAM | 0.050 | Small Effect |
| 5 LEAD *COMP → FAM | 0.096 | Small Effect |
| 6 LEAD *ICS → FAM | 0.005 | Small Effect |
| 7 LEAD *IT → FAM | 0.053 | Small Effect |

Source: Data processing result using SmartPLS 4

To measure the contribution of each variable, Effect Size (f^2) is used. The f^2 value indicates the magnitude of the partial influence of the exogenous variable on the endogenous variable, with categories ranging from strong (≥ 0.35), moderate (0.15–0.35), and weak (0.02–0.15). The results in **Table 4** indicate that the utilization of information technology (IT) has a strong influence on fixed asset management, with an f^2 value of 0.425. These findings provide empirical evidence that the greater the utilization of

information technology for state-owned assets, the more effective the management of fixed assets at Cenderawasih University.

Meanwhile, the variables of competence, ICS, leadership, and the interaction of leadership with the other three exogenous variables show f^2 values in the weak category. This indicates that although these factors contribute, the strongest influence in the model is the utilization of information technology, while other factors are more supportive of the effectiveness of fixed asset management.

4.3 Hypothesis testing

Hypothesis testing was conducted on direct influence and moderating influence.

Table 5

Path Coefficients and Hypothesis Testing

| Hypothesis | Path Coefficient | T statistics | P values | Result |
|------------------|------------------|--------------|----------|-----------------|
| COMP → FAM | 0.238 | 3.213 | 0.001** | Significant |
| ICS → FAM | 0.174 | 2.720 | 0.007** | Significant |
| IT → FAM | 0.510 | 5.107 | 0.000** | Significant |
| LEAD *COMP → FAM | 0.271 | 2.441 | 0.015* | Significant |
| LEAD *ICS → FAM | -0.053 | 0.605 | 0.545 | Non-Significant |
| LEAD *IT → FAM | 0.159 | 2.224 | 0.026* | Significant |

Source: Data processing result using SmartPLS 4

The direct effect analysis presented in **Table 5** shows that competence has a significant positive impact on fixed asset management at Cenderawasih University ($t=3.213$; $p=0.001$), indicating that higher employee competency enhances asset management performance. The ICS also demonstrates a significant positive effect ($t=2.720$; $p=0.007$), confirming that stronger control mechanisms improve fixed asset management effectiveness at Cenderawasih University. Additionally, the utilization of information technology exhibits a significant positive influence on fixed asset management ($t=5.107$; $p=0.000$), suggesting that greater technological adoption contributes to improved asset management outcomes at Cenderawasih University.

In terms of moderation, leadership significantly moderated the relationship between competence and fixed asset management ($t = 2.441$; $p = 0.015$), providing empirical evidence that higher interaction between leadership and employee competence enhances the effectiveness of fixed asset management. Leadership also moderated the

relationship between information technology utilization and fixed asset management ($t = 2.224$; $p = 0.026$), indicating that the interaction between leadership and IT utilization positively contributes to asset management. However, leadership did not moderate the relationship between ICS and fixed asset management ($t = 0.605$; $p = 0.545$), suggesting that leadership does not strengthen the effect of ICS on fixed asset management. Overall, these results indicate that leadership plays an important role in enhancing the effects of competence and IT utilization on fixed asset management, but does not exert a moderating effect on the influence of ICS.

5 DISCUSSION

5.1 Competence

This study's findings indicate that employee competence positively influences fixed asset management at Cenderawasih University. Enhanced employee competence, encompassing knowledge, skills, values, and interests, leads to more effective fixed asset management. This result aligns with studies conducted by YULIANTI; ANDAYANI; GHOFAR (2024), which highlight the critical role of human resource quality in asset management, although some studies have reported differing effects. The analysis identified knowledge as the most significant competency asset, consistent with the respondents' academic background, predominantly holding at least a bachelor's degree. This suggests that improving competence can be effectively achieved through training, technical guidance, and ongoing coaching to reinforce the understanding of fixed asset governance in adherence to applicable regulations.

However, this research also identified a limitation: a lack of training experience among some asset management employees. Limited opportunities for technical guidance and training, coupled with weak knowledge transfer from unit leaders, have resulted in an uneven understanding among asset management staff, who tend to rely solely on personal experience. This situation contributes to lower asset management effectiveness, despite the importance of robust coordination between unit leaders and employees for optimal asset governance. Consequently, employee competence is a pivotal factor in supporting effective fixed asset management, ultimately contributing positively to the

optimization of asset utilization and the increase of Non-Tax State Revenue for Cenderawasih University as a Public Service Agency.

5.2 Internal Control System (ICS)

Research findings reveal that the ICS positively impacts fixed asset management at Cenderawasih University. A more adequately implemented ICS correlates with more effective asset management by work units. This finding is consistent with the previous research by IGBOJIOYIBO (2024) and LEAVINS & RAMASWAMY (2023), which underscores the significant role of internal control in maintaining reliable reporting, ensuring asset security, and adhering to regulatory compliance. This supports stewardship theory, emphasizing that public organizations' actions are primarily directed towards collective interests and public service, and aligns with the principles of New Public Management, which advocate for more transparent and accountable governance. Therefore, a sound ICS not only enhances asset management effectiveness but also bolsters the organization's credibility with the public.

However, this study also identified several weaknesses in the implementation of internal control at Cenderawasih University. Respondents perceived the ICS's effectiveness as suboptimal, particularly due to the absence of inventory records in each work unit and weak coordination in the fixed asset procurement planning process. Interviews indicated that these challenges were often triggered by limited budget proposal timeframes, a lack of inter-unit transparency, and item specifications that did not align with actual user needs. Consequently, asset procurement was frequently delayed and not optimally utilized. To enhance asset management effectiveness, all internal control components, from the control environment, risk assessment, control activities, and communication to monitoring, require consistent and continuous strengthening.

5.3 Information technology utilization

The findings of this study indicate that the utilization of information technology has a positive effect on fixed asset management. The more optimally information technology is used in asset management processes, the greater the improvement in the effectiveness and reliability of the information produced. This result is consistent with

previous studies by AL-SHATRI *et al.* (2024) and FASHAL; ELKHAYAT; ELMORSY (2023), which demonstrate that information systems play a direct role in enhancing the quality of fixed asset management across various organizations.

This study also supports stewardship theory, which emphasizes the importance of trust and responsibility in managing organizational resources. Information technology facilitates the realization of transparency, accountability, and efficiency through management information systems, real-time asset tracking, IT-based auditing, and automated asset management processes. With the support of these technologies, Cenderawasih University can generate more accurate, timely, and accountable asset information for its stakeholders.

5.4 Moderation Leadership-Competence

The research results demonstrate that leadership moderates the relationship between employee competency and the effectiveness of fixed asset management at Cenderawasih University. Higher employee competency leads to greater fixed asset management effectiveness when supported by strong leadership. This finding is consistent with research by UMAR; FIRMAN; OKTAVIANI (2023), which showed that leadership significantly strengthens the positive relationship between competence and employee performance.

Furthermore, these findings align with a study by ASSET *et al.* (2022), which emphasized the crucial role of organizational support, including leadership, in enhancing work effectiveness through knowledge sharing. This concept resonates with SENGE's (2006) theory of the learning organization, which highlights leaders' roles in developing employee competence, clarifying organizational vision, and fostering continuous learning. Thus, superior leadership within an organization amplifies the impact of employee competence on fixed asset management effectiveness, ultimately contributing to the optimization of Cenderawasih University's revenue as a Public Service Agency.

5.5 Moderation Leadership-ICS

The findings indicate that leadership does not moderate the influence of the ICS on fixed asset management at Cenderawasih University. This contrasts with previous

studies by MAHMUD *et al.* (2024), who concluded that quality leadership strengthens the relationship between the ICS and an organization's asset management. This discrepancy may stem from the fact that excessive top leadership involvement can potentially weaken internal control effectiveness, as employees might feel less trusted or motivated, and there's a risk of intervention that compromises the system's implementation independence.

This aligns with SUPRIADDIN; LIWAUL; ZALUDIN (2022), who revealed that the moderating role of leadership exerts a significantly negative influence on the relationship between the ICS and governance practices in public sector organizations. As explained in earlier research by WANG *et al.* (2021), this finding underscores the importance of distinguishing between excessive intervention and active leadership support in the implementation of ICS. Inappropriate intervention can weaken the system, create opportunities for fraud, and erode confidence in the organization's integrity, especially if it involves manipulating audit evidence or compromising internal auditors' independence. Therefore, leadership should provide supportive, rather than excessively intervening, assistance by upholding principles of integrity and accountability. With the right leadership approach, the ICS for managing fixed assets can operate more effectively, supporting continuous improvement at Cenderawasih University.

5.6 Moderation leadership-information technology

The results suggest that leadership moderates the influence of information technology utilization on fixed asset management at Cenderawasih University. Increased leadership involvement in supporting information technology utilization leads to more effective fixed asset management. This finding aligns with previous research by HWANGBO; SHIN; KIM (2022), which demonstrates that when the utilization of technology is empirically shown to influence organizational performance, leadership exerts a moderating effect on both financial and non-financial outcomes. This result is also consistent with the study conducted by RASIKA and ESTHI (2025), indicating that leadership support reinforces the relationship between technological advancement and organizational performance, particularly through the role of e-leadership in enhancing the effectiveness of management information systems.

Theoretically, these results also align with stewardship theory, which emphasizes the responsibility and trustworthiness of leaders as stewards of organizational assets. In fixed asset management, top management plays a vital role in ensuring IT infrastructure availability, resource allocation, and support for a competent workforce. Effective leadership optimizes information technology use, thereby enhancing the effectiveness and transparency of fixed asset management. This ultimately has implications for optimizing Cenderawasih University's revenue as a Public Service Agency.

5.7 Novelty

The results from the structural equation model testing indicate that employee competence, ICS, and information technology utilization significantly and positively influence fixed asset management at Cenderawasih University. Moreover, leadership acts as a moderator, enhancing the relationship between competence and information technology utilization in relation to fixed asset management effectiveness. Specifically, higher competence and IT utilization, when supported by strong leadership, lead to greater effectiveness in asset management. However, leadership moderation did not significantly impact the relationship between ICS and fixed asset management; indeed, excessive leadership involvement could potentially diminish the effectiveness of the ICS. Consequently, this study confirms that leadership significantly strengthens the influence of competence and information technology on fixed asset management, but not on the ICS aspect.

6 CONCLUSION

This study aims to examine the influence of competency, ICS, and information technology utilization on fixed asset management at Cenderawasih University, while also assessing the role of leadership as a moderating variable in strengthening or weakening the relationship between these variables and the effectiveness of fixed asset management. Based on the results of the hypothesis analysis, this study indicates that employee competency has a positive effect on fixed asset management, meaning that the higher the ASSET competency, the more effective the fixed asset management.

Furthermore, this study also proves that the ICS and information technology utilization positively influence fixed asset management. The better the implementation of the ICS and the more optimal the use of information technology in fixed asset management, the greater the effectiveness of fixed asset management at Cenderawasih University.

Furthermore, the results show that leadership has a varying moderating role: leadership can strengthen the influence of competency and information technology utilization on fixed asset management, so that leader involvement in supporting ASSET development and IT utilization increases management effectiveness. However, leadership does not strengthen the influence of the ICS on fixed asset management; excessive leadership involvement can actually weaken the effectiveness of the ICS.

7 LIMITATION

This study has several limitations that need to be considered in further research. First, data collection was not conducted directly during questionnaire distribution, so the researcher cannot be certain that the respondents who completed the questionnaires truly met the expected conditions. Second, the leadership variables used were limited to general leadership, so the results may differ if applied to other, more specific leadership types. Third, this study was conducted only at Cenderawasih University, so the results cannot be generalized to other contexts outside the university. Fourth, the measurement of fixed asset management effectiveness only used competency, ICS, and information technology utilization variables, so it is unable to explain the influence of other variables, such as organizational commitment, which also have the potential to influence fixed asset management.

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Authors' Contribution

Conceptualization, Aprianto La'lang Kuddy and Pisi Bethania Titalessy; methodology, Pisi Bethania Titalessy; data collection and investigation, Sheilla Putri Agustin and Hesty Murwanipurti; formal analysis, Pisi Bethania Titalessy; data curation, Sheilla Putri Agustin; writing—original draft preparation, Pisi Bethania Titalessy; writing—review and editing, Aprianto La'lang Kuddy and Hesty Murwanipurti; visualization, Sheilla Putri Agustin; supervision, Aprianto La'lang Kuddy; project administration, Pisi Bethania Titalessy. All authors have read and agreed to the published version of the manuscript.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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