International Journal of Economic Integration and Regional Competitiveness
Homepage : https://e-journal.antispublisher.id/index.php/IJEIRC
Email : admin@antispublisher.com

e-ISSN : 3032-1301
IJEIRC, Vol. 2, No. 11, November 2025
Page 76-95

The Role of AI, IoT, and RFID-Based Digital Inventory Control Systems in Improving Operational and Financial Performance (A Study of Retail Companies Listed on the Indonesia Stock Exchange for the Period 2020-2024)

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DOI : https://doi.org/10.61796/ijeirc.v2i11.428

Sections Info

Article history:
Submitted: August 31, 2025
Final Revised: September 16, 2025
Accepted: September 30, 2025
Published: October 23, 2025

Keywords:
Inventory control system
AI, IoT, and RFID
Operational performance
Financial performance
Inventory turnover
Gross profit margin
Net profit margin
Return on assets

ABSTRACT

Objective: *This study aims to determine the role of AI, IoT, and RFID-based digital inventory control systems in improving the operational and financial performance of the retail industry in Indonesia. Operational performance is measured by inventory turnover, while financial performance is measured by gross profit margin, net profit margin, and return on assets.* ***Method:*** *This study uses secondary data, namely data provided by retail companies listed on the Indonesia Stock Exchange during 2020-2024. The sample was selected using a purposive technique of 22 companies. The method used was simple linear regression analysis.* ***Results:*** *The results of this study show that, first, there is no effect of the digital inventory control system variable on inventory turnover. Second, there is an effect of the digital inventory control system variable on gross profit margin. Third, there is an effect of the digital inventory control system variable on net profit margin. Fourth, there is an effect of the digital inventory control system variable on return on assets. Fifth, there is an effect of the digital inventory control system variable on financial performance.* ***Novelty:*** *The novelty of this study lies in examining the role of AI, IoT, and RFID-based digital inventory control systems specifically on both operational performance – measured by inventory turnover – and multiple dimensions of financial performance, including gross profit margin, net profit margin, and return on assets, using retail companies listed on the Indonesia Stock Exchange during 2020-2024. This research provides a new perspective by integrating advanced digital technologies into the analysis of performance indicators in the Indonesian retail industry.*

INTRODUCTION

The global retail industry is currently undergoing a massive digital transformation, with projections that over 50% of consumer spending will shift to online platforms by 2024 [1]. This phenomenon is reinforced by data from the National Retail Federation, which shows that digitally influenced sales have surpassed 60% of total retail sales, marking a new era in inventory management. This trend is also reflected in the rapid growth of the global inventory management software market, which is projected to reach USD 7.14 billion by 2033 with a CAGR of 6.7% from 2025 to 2033 [2], driven by businesses' urgent need to optimize supply chains, reduce operational costs, and improve efficiency across various sectors. Previous research consistently indicates that the role of advanced technologies such as Artificial Intelligence (AI), Radio-Frequency Identification (RFID), and the Internet of Things (IoT) significantly improves operational performance thru better inventory visibility, reduced lead times, and real-time decision-making capabilities [1], [3], [4], [5]. Farah et al. (2024) emphasize that efficient inventory management is a

vital prerequisite for operational performance and financial competitiveness, given its direct impact on supply chain efficiency and corporate profitability. A study by Immadisetty showed that a real-time inventory management system integrating RFID, IoT, and real-time analytics facilitates effective inventory tracking, enabling retailers to respond quickly to market demand fluctuations [6]. It identified an autonomous inventory replenishment system thru real-time visibility and IoT and RFID-based collaboration as an innovative solution in inventory management [7], [8]. Advanced technology in inventory management systems is no longer an option, but a strategic necessity to maintain a competitive edge in a dynamic market environment, as it has been proven to facilitate real-time product tracking, more accurate forecasting, and efficient inventory administration [6], [9], [10], [11].

Nevertheless, there is a significant research gap regarding the comprehensive integration of digital inventory control systems and their impact on the overall performance of the retail industry. Previous studies have tended to focus on single technological aspects (e.g., RFID or AI separately), but have not deeply explored how multi-technology synergies can optimize overall retail performance. Wilson's (2022) research identifies that successful inventory management strategies require a comprehensive conceptual framework, but there are still limitations in understanding the phenomenon and effective strategies [12]. Challenges such as inventory inaccuracies, order fulfillment reliability, and optimizing technology utilization still pose major obstacles for retailers experiencing stagnant growth [13], [14], necessitating further exploration of the practical role of digital systems in the retail industry context. This research is based on several fundamental theories, namely Contingency Theory (Lawrence & Lorsch), which explains the need for technological adaptation according to the characteristics of the retail industry; the Technology Acceptance Model (TAM) (Davis) for understanding factors influencing technology adoption; the Resource-Based View (RBV) Theory, which analyzes the competitive advantages of digital technology resources [15], [16]; Systems Theory as the basis for integrating various technology components (IoT, RFID, and AI) to improve operational performance [1]; and Supply Chain Management Theory, which provides a perspective on optimizing the flow of information and materials within the retail supply chain [17].

The novelty of this research lies in its holistic approach, which integrates multiple digital technologies (IoT, RFID, and AI) into a comprehensive inventory control system framework, unlike previous studies that analyzed the technologies separately. This research also introduces novelty in the development of specific performance indicators to measure the effectiveness of the digital inventory control system's role, covering operational, financial, and customer satisfaction aspects in a measurable way. Additionally, this study employs a purely quantitative approach, combining big data analysis with internal operational data from the retail company to objectively measure the impact of this technology. Another unique contribution is the development of a role framework that can be adapted by various scales of retail companies in Indonesia, from MSMEs to large corporations, taking into account local market characteristics and the

resource constraints often faced. In Indonesia, the retail industry is showing substantial growth, with sales projected to reach approximately USD 243 billion by 2026 [1], and the national Real Sales Index (RSI) reaching a record high of 242.9 in April 2023 post-Covid-19 pandemic (Bank Indonesia in Hasahatan & Kusdanu Waskito, 2025). However, the fluctuations in Indonesia's retail sales growth, which stood at 0.0% in May 2023 after 1.5% in April 2023 [1], indicate the need for an adaptive inventory management system to respond to the rapidly changing dynamics of market demand. The main phenomenon to be studied is digital transformation in inventory management within the Indonesian retail industry, specifically in the post-pandemic era where consumer behavior has fundamentally changed. This research will analyze the phenomenon of discrepancies between recorded data and the physical condition of goods caused by data entry errors, inspection negligence, and lack of supervision [13]. Additionally, the research will explore the phenomenon of resistance to change management in the adoption of digital technology, the adaptation of traditional retailers to omnichannel strategies, and the analysis of volatile consumer demand patterns using predictive analytics. The purpose of this research is to determine the role of an AI, IoT, and RFID-based digital inventory control system in improving the operational and financial performance of the retail industry in Indonesia, thru the analysis of historical data on performance metrics such as inventory turnover rate and profitability. Furthermore, this research aims to develop a comprehensive multi-technology integration model for inventory control systems, based on patterns and correlations found from quantitative data to identify the most effective technology configurations.

Hypothesis Development

1. **H1: The implementation of an AI, IoT, and RFID-based digital inventory control system significantly improves the operational performance of the retail industry in Indonesia.**

A quick response system is one application of technologies such as AI, IoT, and RFID in the retail industry. RFID facilitates this system by tracking products. This system minimizes inventory in the dressing room and product shelf shrinkage, while also improving store security and the ability to analyze sales data. The application of this technology is able to reduce errors and avoid losses from fully automated inventory control by implementing a simple heuristic extension. By using technologies like RFID and software agents, integrated information systems can overcome the mentioned problems. By enabling telecommunication of client inventory levels to the manufacturer, installing electronic devices inside containers increases the chances of timely pickup. This can help suppliers coordinate shipments and rebalance retailers' stock positions. A new approach has been mentioned to maximize the profits of specific retailers by promoting items that are about to expire, which helps with sales, reduces inventory costs, and prevents product loss. By recognizing the role of inventory management in the supply chain and the impact of IoT technology on inventory management. Inventory management aims to optimize inventory by planning and controlling inventory levels to reduce inventory costs and improve customer service satisfaction. Generally, there are

two types of inventory review in inventory management based on the inventory review approach: periodic review and continuous review. With continuous inventory review, inventory levels must be monitored continuously. Orders must be placed whenever the inventory level is less than the predetermined amount. The predetermined quantity is referred to as the reorder point [18].

IoT is receiving a lot of attention as one of the Industry 4.0 modules in this concept. IoT is a powerful communication between the physical and digital worlds used in various fields to make goods, operations, and services smarter within the value chain by offering new potential solutions to transform their functions. IoT can have a significant impact on the supply chain thru effective resource utilization, transparency and visibility across the entire supply chain, real-time supply chain management, supply chain optimization, and increased supply chain agility. This makes operational performance easier for companies [18].

RFID can improve the performance of the entire supply chain, from warehousing to transportation, thru real-time communication and information sharing. RFID can improve inventory flow by increasing product traceability and visibility. RFID can help reduce inventory losses and misplacements, as well as limit transaction errors and supply chain mistakes [19]. By implementing effective inventory accounting practices, businesses can improve financial transparency, optimize inventory management, and make sound decisions to increase profits and operational efficiency [20]. The use of technology in retail businesses is based on the fundamental principles of connectivity, intelligence, and automation. By leveraging IoT devices, smart sensors, and interconnected systems, retailers gain visibility into every aspect of their operations, from inventory levels and customer preferences to store traffic patterns and sales trends. This impacts inventory management and customer engagement, as well as operational efficiency and strategic decision-making [21].

Based on the explanation regarding the digital inventory control system's impact on inventory turnover or operational performance, the following hypotheses can be proposed:

a. H1a: The implementation of an AI, IoT, and RFID-based digital inventory control system is positively correlated with an increase in Inventory Turnover.

2. H2: The implementation of an AI, IoT, and RFID-based digital inventory control system significantly improves the financial performance of the retail industry in Indonesia.

This technology helps companies analyze vast amounts of financial data, making it easier for them to make important decisions. With an automated system, communication between the finance team and other departments in the company can be improved, leading to faster financial processes and better understanding of the company's financial condition by everyone [22].

In the IoT environment, the intelligent interconnection between various heterogeneous manufacturing products and facilities generates big data in real-time during the dynamic operation of the system. The utilization of big data impacts profit

improvement, making it crucial to enhance the company's data processing capabilities and add value to the process. Therefore, big data in the IoT environment has become a significant strategic asset for companies [19].

RFID (Radio Frequency Identification) technology is a rapidly developing technology, especially in the retail business sector today. Various types of retail businesses can utilize this technology in various applications, aiming to improve work performance and reduce operational costs [23]. The transformative potential of digital technology allows organizations to adapt to dynamic market conditions and meet customer demands more effectively. By leveraging real-time data and advanced analytics, businesses can make informed decisions that drive strategic inventory policies, reduce costs, and improve overall performance. The proper use of technology will boost company performance, particularly its financial performance [10].

Based on the explanation regarding the digital inventory control system's impact on company financial performance, the following hypotheses can be proposed:

a. H2a: The implementation of an AI, IoT, and RFID-based digital inventory control system is positively correlated with an increase in Gross Profit Margin (GPM).
b. H2b: The implementation of an AI, IoT, and RFID-based digital inventory control system is positively correlated with an increase in Return on Assets (ROA).
c. H1c: The implementation of an AI, IoT, and RFID-based digital inventory control system is positively correlated with an increase in Net Profit Margin (NPM).

Based on the explanation regarding the digital inventory control system's impact on inventory returns or operational and financial performance, the following research framework can be provided:

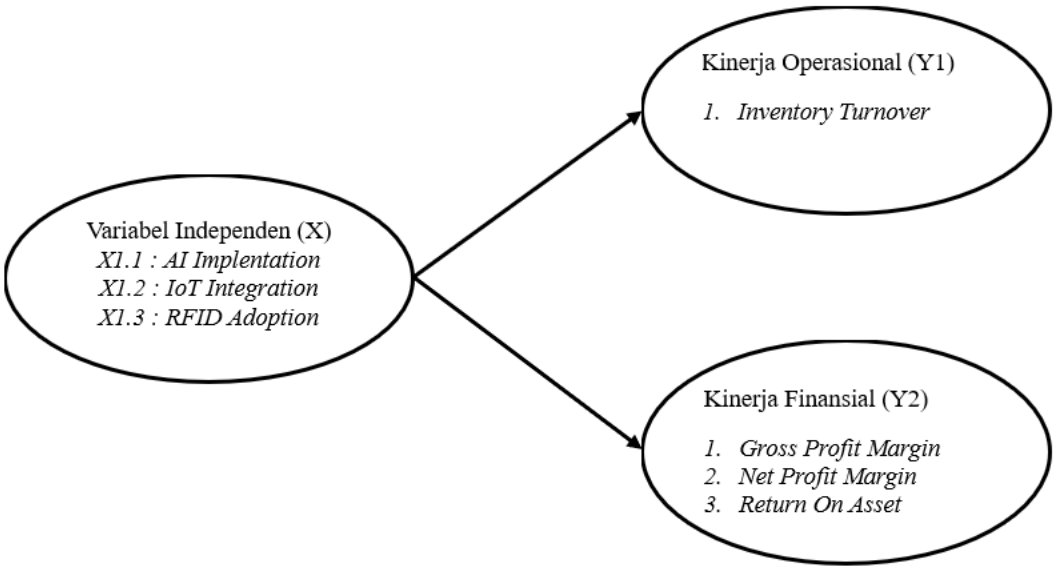

Figure 1. Conceptual Framework.

RESEARCH METHOD

Research Type

This study adopts a quantitative approach to examine the causal relationship between the implementation of a digital inventory control system and the performance of the retail industry. The quantitative approach was chosen because it allows for objective measurement of variables, statistical analysis, and generalization of findings to a wider population.

Types and Sources of Data

This research uses secondary data, which is data that has been provided by retail companies listed on the Indonesia Stock Exchange during 2020-2024. The sample was selected using purposive sampling based on two criteria: (1) the company has complete annual reports and/or financial statements available for 2020–2024, and (2) there is explicit and verifiable information regarding the implementation of inventory control technology (AI, IoT, and/or RFID) in official company documents (annual/sustainability reports, public disclosures, press releases, or websites).

Table 1. Number of Research Samples.

Information	Amount
Retail companies listed on IDX 2020–2024	31
Companies with no explicit data found regarding the use of technology	8
Companies that changed business focus	1
Selected Sample	22
Research range 2020–2024	5
Total Sample	110

Research Variables and Measurement

The independent variable is the Digital Inventory Control System Adoption Index (DISI), which measures the level of digital technology adoption in inventory control. DISI is formed from three annual dummy indicators: IoT, RFID, and AI/ML/predictive analytics. Each is worth 1 if evidence of active implementation (pilot or operational) is found in year t, and 0 otherwise. Additionally, in accordance with the reporting of results, financial performance was also analyzed as a composite index (Y2) that combines information on GPM, NPM, and ROA. The Y2 index was constructed as the average of the financial indicators (with scale standardization if necessary) to obtain an aggregate measure of financial performance per firm-year.

Table 2. Operational Definitions of the Study.

Variable	Indicator	Formula	Unit
Digital Inventory System	AI, IoT, and RFID	DISIit = IoTit + RFIDit + AIit	Dummy (Range 0–3)
Operational Performance	Inventory Turnover	IT = COGS / ((Total Beginning Inventory + Total Ending Inventory) / 2)	Ratio

	Gross Profit Margin (GPM)	GPM = Gross Profit / Total Sales	Ratio
Company Financials	Net Profit Margin (NPM)	NPM = Net Profit / Total Sales	Ratio
	Return On Assets (ROA)	ROA = Net Profit / Average Assets	Ratio

Data Collection and Processing Procedures

Data collection was carried out by downloading the company's official archives for the period 2020–2024. From the document, performance metrics (Inventory Turnover, GPM, NPM, ROA, and Y2) were extracted directly from the financial statements. The DISI variable was coded by searching for the keywords "IoT/sensor," "RFID/tag/reader," and "AI/ML/forecasting/predictive analytics" in company documents, followed by verifying active implementation evidence in the relevant year. The dataset was then compiled in a firm-year format containing DISI and all performance indicators. Data cleaning includes harmonizing units and formats, checking consistency, marking missing data without imputation in the main analysis, and recording outliers (winsorizing is only used if necessary as a sensitivity test and is explicitly stated).

Data Analysis Techniques

In accordance with the research focus and reported results, the analysis used simple linear regression for each dependent variable against DISI. The general specifications of the model are:

$$Yit=\alpha+\beta\ DISIit+\varepsilon it, Yit=\alpha+\beta DISIit+\varepsilon it,$$

With Y representing: (1) Inventory Turnover (Y1), (2) GPM (Y21), (3) NPM (Y22), (4) ROA (Y23), and (5) Composite Financial Performance (Y2). Estimation was performed at a 5% significance level using a t-test for the $\beta\beta$ coefficient, and correlation effect size (R), coefficient of determination (R^2), and Adjusted R^2 were reported.

The data analysis technique used is multiple regression analysis. This analysis model is used to examine the relationship between independent variables and dependent variables. The tool used in this study is IBM SPSS Statistics 25.

1. Normality Test

The normality test is used to determine whether the regression model in this study has normally distributed residual data or not. A good regression model is one that has normally distributed residual data. Data is said to be normally distributed if the significance value is greater than 0.05.

2. Regression Test

Reporting effect sizes includes correlation (R), coefficient of determination R2, and Adjusted R2 to assess the strength and quality of the model's explanation. A larger R value indicates a stronger relationship in the same direction as the coefficient, while R2 represents the proportion of variation in the dependent variable explained by DISI. Adjusted R2 provides a correction for sample size, making the interpretation more

conservative. There is no universal standard threshold for "good" or "bad"; interpretation is done contextually, considering industry characteristics and data quality.

3. Partial Coefficient Significance Test (t-test)

The partial coefficient significance test, using the t-test, is intended to test whether the β coefficient for the DISI variable is significantly different from zero for each separate model that predicts Inventory Turnover, GPM, NPM, ROA, and the composite financial performance index. The decision is based on a p-value less than 0.05 (two-tailed), or equivalently, a 95% confidence interval that does not cross zero; the sign of the coefficient indicates the direction of the effect (positive or negative). In line with the research findings, the effect of DISI on Inventory Turnover is not significant, while the effect on GPM, NPM, ROA, and the composite financial index is significantly positive, indicating that increased inventory technology adoption is associated with improved financial performance.

RESULTS AND DISCUSSION

Results

The analysis conducted in this study aims to analyze the Digital Inventory System's impact on operational and financial performance. There are 5 regression testing models that were performed. Hypothesis testing in this study used linear regression analysis, preceded by a normality test. Here are the results of the analysis that has been conducted.

Normality Assumption Testing

The normality test performed was the Kolmogorov-Smirnov test. Drawing conclusions to determine whether data follows a normal distribution or not. The provision for this test is that if significant > 0.05, then the variable is normally distributed. Here are the results of the normality test for each regression model:

Table 3. Normality Test.

Regression Model	Kolmogorov-Smirnov Sig.	Information
Operational Performance		
Digital Inventory System → Inventory Turnover	0.083	Normally Distributed
Company Financials		
Digital Inventory System → Gross Profit Margin	0.062	Normally Distributed
Digital Inventory System → Net Profit Margin	0.897	Normally Distributed
Digital Inventory System → Return On Asset	0.090	Normally Distributed
Digital Inventory System → Company Financials	0.852	Normally Distributed

Testing was conducted on four regression models, where the digital inventory system was tested against operational performance measured by inventory turnover.

Then, the digital inventory system was tested against company financials measured by gross profit margin, net profit margin, and return on assets. The normality test for the overall model has a significance value greater than 0.05, therefore the data is normally distributed. Here is the normality plot for the normality test:

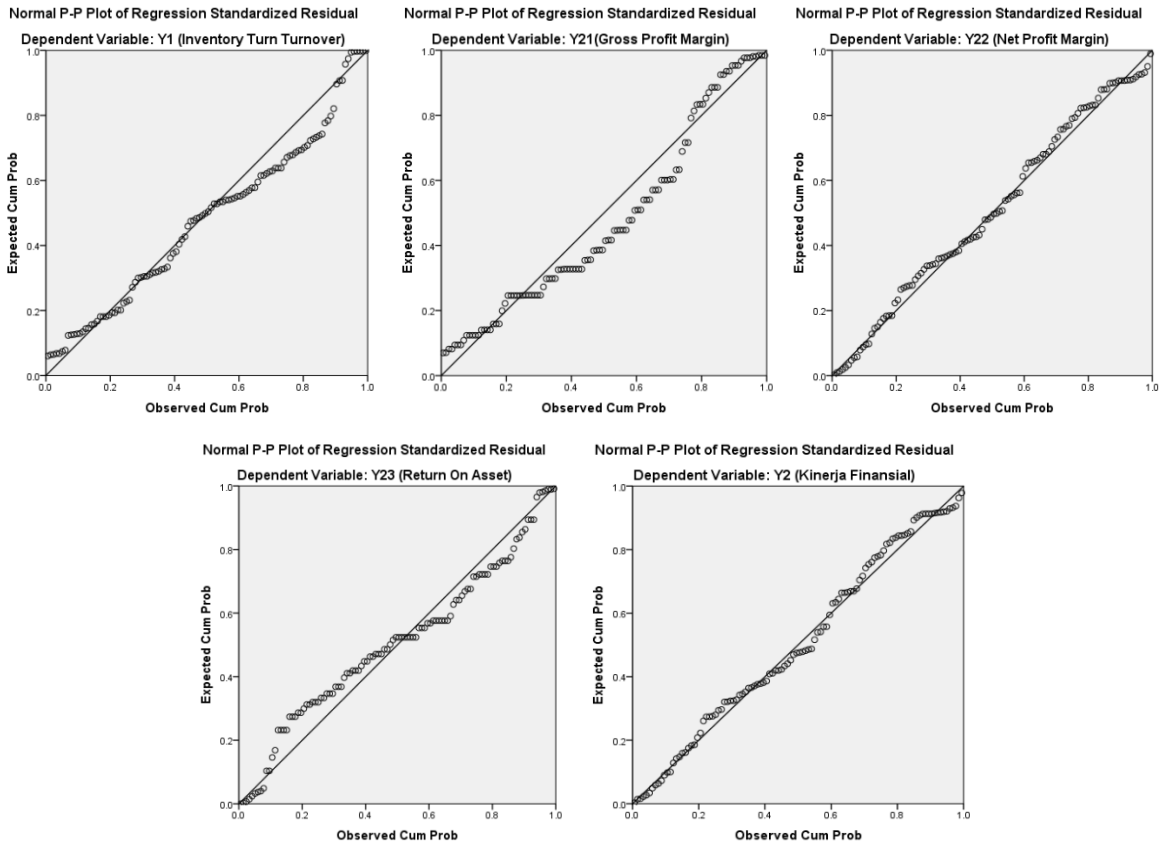

Figure 2. Normality P-P Plot Regression Model.

Normality testing using the normality p-p plot shows that the data points follow the diagonal line, indicating that the data is normally distributed. Normality testing for the entire model has a significance value greater than 0.05, therefore the data is normally distributed, and graphical testing also shows that the data is normally distributed. Therefore, the assumption test is met and the linear regression test can be performed.

Hypothesis Testing

Hypothesis testing was conducted using the simple linear regression method thru the SPSS program. This testing includes the t-test or partial test, as well as the coefficient of determination test. The partial test is used to determine the influence of each variable on the dependent variable, and if the significance value is less than 0.05, then that variable has a significant influence. The coefficient of determination test aims to analyze the extent to which these variables influence the outcome. Here are the results of the regression tests for each variable:

Table 4. Linear Regression Test.

Regression Model	(Constant)	Coefficient	t stat	sig	r square	Information
Operational Performance						
Digital Inventory System → Inventory Turnover	1.959	-0.035	-0.631	0.530	0.004	No Effect
Company Financials						
Digital Inventory System → Gross Profit Margin	0.127	0.040	3.741	0.000	0.115	Affected
Digital Inventory System → Net Profit Margin	-7.714	0.377	2.123	0.036	0.040	Affected
Digital Inventory System → Return On Asset	-0.083	0.013	2.020	0.046	0.036	Affected
Digital Inventory System → Company Financials	-7.668	0.429	2.315	0.023	0.047	Affected

The Influence of Digital Inventory Systems on Inventory Turnover

Based on the calculations in the table above, the simple linear regression equation is obtained as follows:

$$Y = 1.959 - 0.035\ X \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Based on the regression model, it can be explained as follows: The constant value is 1.959. This means that if variable Y1 (Inventory Turnover) is not influenced by its independent variable, X (Digital Inventory Control System), it will be 1.959.

The regression coefficient for variable X is positive, indicating a direct relationship between X (Digital Inventory Control System) and Y1 (Inventory Turnover). The regression coefficient for variable X is -0.035, meaning that for every one-unit increase in X (Digital Inventory Control System), Y1 (Inventory Turnover) will decrease by 0.035. Based on the table above, it can be concluded that Variable X (Digital Inventory Control System) has a significance value of 0.530 and a calculated t-value of -0.631. Since the significance value (0.530) is greater than 0.05 and the calculated t-value (-0.631) is greater than the table t-value (-1.982), H1 is rejected, meaning there is no effect of Variable X (Digital Inventory Control System) on Y1 (Inventory Turnover).

The value of the coefficient of determination or R-squared is 0.004 or 0.4%. This means that variable X (Digital Inventory Control System) has a 0.4% influence on Y1 (Inventory Turnover). The remaining 99.6% is the contribution of other variables besides X (Digital Inventory Control System).

The Influence of Digital Inventory Systems on Gross Profit Margin

Based on the calculations in the table above, the simple linear regression equation is obtained as follows:

$$Y = 0.127 + 0.040\ X \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Based on the regression model, this can be explained as follows:

From the simple linear regression equation above, the constant value is 0.127. This means that if variable Y21 (Gross Profit Margin) is not influenced by its independent variable X (Digital Inventory Control System), it will be 0.127.

The regression coefficient for the independent variable X is positive, indicating a direct relationship between X (Digital Inventory Control System) and Y21 (Gross Profit Margin). The regression coefficient for variable X is 0.040, meaning that for every one-unit increase in X (Digital Inventory Control System), Y21 (Gross Profit Margin) will increase by 0.040. Based on the table above, it can be concluded that Variable X (Digital Inventory Control System) has a significance value of 0.000 and a calculated t-value of 3.741. Since the significance value (0.000) < 0.05 and the calculated t-value (3.741) > the t-table value (1.982), H1 is accepted, meaning there is an influence of Variable X (Digital Inventory Control System) on Y21 (Gross Profit Margin).

The value of the coefficient of determination or R-squared is 0.115 or 11.5%. This means that variable X (Digital Inventory Control System) has an influence of 11.5% on Y21 (Gross Profit Margin). The remaining 87.5% is the contribution of other variables besides X (Digital Inventory Control System).

The Influence of Digital Inventory Systems on Net Profit Margin

Based on the calculations in the table above, the simple linear regression equation is obtained as follows:

$$Y = -7.714 + 0.377\ X \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Based on the regression model, this can be explained as follows:

From the simple linear regression equation above, the constant value is -7.714. This means that if variable Y22 (Net Profit Margin) is not influenced by its independent variable X (Digital Inventory Control System), it will be -7.714.

The regression coefficient for the independent variable X is positive, indicating a direct relationship between X (Digital Inventory Control System) and Y22 (Net Profit Margin). The regression coefficient for variable X is 0.377, meaning that for every one-unit increase in X (Digital Inventory Control System), Y22 (Net Profit Margin) will increase by 0.377. Based on the table above, it can be concluded that Variable X (Digital Inventory Control System) has a significance value of 0.036 and a calculated t-value of 2.123. Since the significance value (0.036) is less than 0.05 and the calculated t-value (2.123) is greater than the t-table value (1.982), H1 is accepted, meaning there is an influence of Variable X (Digital Inventory Control System) on Y22 (Net Profit Margin).

The value of the coefficient of determination or R-squared is 0.040 or 4.0%. This means that variable X (Digital Inventory Control System) has a 4.0% influence on Y22 (Net Profit Margin). The remaining 96.0% is the contribution of other variables besides X (Digital Inventory Control System).

The Influence of Digital Inventory Systems on Return on Assets

Based on the calculations in the table above, the simple linear regression equation is obtained as follows:

$$Y = -0.083 + 0.013\ X \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Based on the regression model, it can be explained as follows: From the simple linear regression equation above, the constant value is -0.083. This means that if variable Y23 (Return On Asset) is not influenced by its independent variable X (Digital Inventory Control System), it will be -0.083.

The regression coefficient for the independent variable X is positive, indicating a direct relationship between X (Digital Inventory Control System) and Y23 (Return On Asset). The regression coefficient for variable X is 0.013, meaning that for every one-unit increase in X (Digital Inventory Control System), Y23 (Return On Asset) will increase by 0.013. Based on the table above, it can be concluded that Variable X (Digital Inventory Control System) has a significance value of 0.046 and a calculated t-value of 2.020. Since the significance value (0.046) is less than 0.05 and the calculated t-value (2.020) is greater than the t-table value (1.982), H1 is accepted, meaning there is an influence of Variable X (Digital Inventory Control System) on Y23 (Return On Asset).

The value of the coefficient of determination or R-squared is 0.036 or 3.6%. This means that Variable X (Digital Inventory Control System) has a 3.6% influence on Y23 (Return On Asset). The remaining 96.4% is the contribution of other variables besides X (Digital Inventory Control System).

The Influence of Digital Inventory Systems on Company Finances

Based on the calculations in the table above, the following simple linear regression equation was obtained:

$$Y = -7.668 + 0.429\ X \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

From the above simple linear regression equation, the constant value is -7.668. This means that if variable Y2 (Financial Performance) is not influenced by its independent variable X (Digital Inventory Control System), it will be valued at -7.668.

The regression coefficient for the independent variable X is positive, indicating a direct relationship between X (Digital Inventory Control System) and Y2 (Financial Performance). The regression coefficient for variable X is 0.429, meaning that for every one-unit increase in X (Digital Inventory Control System), Y2 (Financial Performance) will increase by 0.429. Based on the table above, it can be concluded that Variable X (Digital Inventory Control System) has a significance value of 0.023 and a calculated t-value of 2.315. Since the significance value (0.023) is less than 0.05 and the calculated t-value (2.315) is greater than the t-table value (1.982), H1 is accepted, meaning there is an influence of Variable X (Digital Inventory Control System) on Y2 (Financial Performance).

The value of the coefficient of determination or R-squared is 0.047 or 4.7%. This means that variable X (Digital Inventory Control System) has a 4.7% influence on Y2 (Financial Performance). The remaining 95.3% is the contribution of other variables besides X (Digital Inventory Control System).

Discussion

The Influence of Digital Inventory Systems on Inventory Turnover

There is no influence of variable X (Digital Inventory Control System) on Y1 (Inventory Turnover). The regression coefficient for the independent variable X (Digital Inventory Control System) has a positive value, indicating a direct relationship between X (Digital Inventory Control System) and Y1 (Inventory Turnover). The regression coefficient for variable X (Digital Inventory Control System) is -0.035, meaning that for every one-unit increase in X (Digital Inventory Control System), Y1 (Inventory Turnover) will decrease by 0.035.

Good and timely logistics management is crucial for competing in an increasingly competitive business world. One of the key aspects of a logistics system is inventory monitoring and control [24]. The use of RFID technology in digital stock management can have a significant impact on improving the effectiveness of inventory management in the field of logistics. This technology enables automatic and real-time monitoring of goods, providing more accurate data, speeding up work, and reducing the risk of errors and loss of goods. Additionally, this technology supports warehouse automation, aids decision-making, and increases transparency throughout the supply chain process [25]. However, this study found that the digital inventory control system did not have a significant impact on inventory turnover rates. This is likely due to the sub-optimal implementation of digital transformation, as there are high initial costs, the need for integration with existing systems, and technical limitations such as signal interference and reading distance, which are obstacles to its use. Additionally, human resource readiness is also an important factor, as the use of technologies such as AI, RFID, and IoT requires certain technical understanding and skills.

This research aligns with previous studies that analyzed the impact of digital transformation on inventory turnover conditions across different types of research objects. In their research, it is mentioned that regions with lower levels of financial development, characterized by weaker financial infrastructure and low-quality financial services, present more challenges and uncertainties in financing digital transformation. This results in less significant impacts of digital transformation on improving inventory management efficiency. This indicates that enhancing regional financial development and reducing financing constraints are crucial steps for increasing the effectiveness of digital transformation initiatives. Therefore, the importance of the financial environment in the digital transformation process. By increasing the level of financial development and reducing financing constraints, companies can carry out digital transformation more effectively, improve inventory management efficiency, and achieve sustainable development and economic benefits [26].

The Influence of Digital Inventory Systems on Gross Profit Margin

There is an influence of variable X (Digital Inventory Control System) on Y21 (Gross Profit Margin). The regression coefficient for the independent variable X has a positive value, indicating a direct relationship between X (Digital Inventory Control System) and Y21 (Gross Profit Margin). The regression coefficient for variable X is 0.040, meaning that

for every one-unit increase in X, Y21 (Gross Profit Margin) will increase by 0.040. The population includes not only people, but also other objects and goods within a digital inventory control system.

In supply chain management, RFID-IoT is crucial because it enhances data collection, identification, process improvement, and optimization. RFID-IoT also makes it easier for devices to interact with each other and for people and their surrounding environments to integrate with each other. By enabling comprehensive asset management, loss reduction, and higher transparency, RFID-IoT strengthens the reliability and efficiency of systems. Economically, RFID-IoT improves efficiency by automating tracking, inventory management, and quality control, resulting in lower labor costs, fewer errors, and less loss due to theft or misplacement [7]. This efficiency extends to logistics, where real-time monitoring optimizes routes, reduces fuel costs, and improves demand forecasting, ultimately leading to increased profitability [27].

Digital inventory systems, particularly those based on RFID, impact the gross profit margin. RFID retailers have a positive relationship with increased gross margins, which means that the implementation of RFID improves management efficiency [28]. Retail companies have the power to force their supply chain networks to use RFID technology because it offers significant benefits such as lower labor costs and reduced stockouts. RFID technology provides significant advantages to companies by increasing sales efficiency, leading to higher profits [28].

Inventory valuation determines the value of inventory reported on the balance sheet, which is a significant asset for most businesses. This affects metrics such as working capital, current ratio, and return on assets. Cost of Goods Sold (COGS), derived from inventory valuation, directly impacts gross profit and net profit. This affects profitability ratios such as gross profit margin and operating margin [20]. The research is also consistent with previous studies stating that the application of technology in a digital inventory control system can significantly increase actual gross profit and reduce costs [29].

The Influence of Digital Inventory Systems on Net Profit Margin

There is an influence of variable X (Digital Inventory Control System) on Y22 (Net Profit Margin). The regression coefficient for the independent variable X is positive, indicating a direct relationship between X (Digital Inventory Control System) and Y22 (Net Profit Margin). The regression coefficient for variable X is 0.377, meaning that for every one-unit increase in X (Digital Inventory Control System), Y22 (Net Profit Margin) will increase by 0.377.

This research aligns with Ugbebor, et al (2024), who found that a systematic review of IoT-based inventory shows how such systems can significantly improve efficiency and profitability or net profit. Previous research found that the effectiveness of using a digital control system with RFID affects warehouses, supply chains, and sales income, and is able to reduce costs by 35%. RFID (Radio Frequency Identification) technology is rapidly developing, especially in the retail business sector today. Many retail businesses are using

this technology with various applications to improve work effectiveness and reduce costs [23].

One of the long-term benefits of an IoT-based Digital Inventory Control System is financial. Organizations that integrate IoT into their systems find an increase in working capital deployment [30]. One of the reasons organizations implementing this system experience increased profitability and competitive advantage is because it reduces operational costs while improving the accuracy of inventory records.

The Influence of Digital Inventory Systems on Return on Assets

There is an influence of variable X (Digital Inventory Control System) on Y23 (Return on Assets). The regression coefficient for variable X (Digital Inventory Control System) has a positive value, indicating a direct relationship between X (Digital Inventory Control System) and Y23 (Return on Assets). The regression coefficient value for X is 0.013, meaning that for every one-unit increase in X (Digital Inventory Control System), Y23 (Return on Assets) will increase by 0.013.

Investing in AI and focusing on collaboration between employes and machine learning technology can increase bank revenue by 34% [31]. A digital inventory system can improve a company's Return on Assets (ROA) by increasing the efficiency and effectiveness of inventory management, which impacts profitability and asset turnover. This system helps optimize inventory levels, reduce storage costs, and prevent stockouts that can lead to lost sales, thus indirectly contributing to company profits and more efficient asset utilization.

This research aligns with previous studies that found AI-based digital inventory systems have an impact on bank financial performance. This digital transformation has a positive effect on accounting performance in terms of ROA. With this technology, the system increases revenue. This research contributes to companies that are transforming their operations using digital technology mechanisms and supports the need for more AI disclosure and decision-making [32].

The IoT-based digital inventory system demonstrates how it can dramatically improve the efficiency and profitability of SMEs. IoT integration reduces storage costs and increases stock level accuracy. However, it should be noted that the implementation of this depends on organizational readiness, technical characteristics, and change management plans [33].

The Influence of Digital Inventory Systems on Company Financials

There is an influence of variable X (Digital Inventory Control System) on Y2 (Financial Performance). The regression coefficient for the independent variable X is positive, indicating a direct relationship between X (Digital Inventory Control System) and Y2 (Financial Performance). The regression coefficient for variable X is 0.429, meaning that for every one-unit increase in X (Digital Inventory Control System), Y2 (Financial Performance) will increase by 0.429.

The influence of the AI, IoT, and RFID-based digital inventory system provides companies with greater ease in managing their finances, and companies are also able to increase their revenue. With a digital system, companies have quick and easy access to

data, allowing them to manage their cash flow more effectively and monitor inventory availability. Additionally, by minimizing stockouts and responding faster to market demands, companies can maximize sales, which directly impacts revenue growth.

Digital transformation in financial management involves the use of modern technologies such as big data and artificial intelligence (AI). These technologies help companies quickly analyze large amounts of financial data and provide deeper insights for making sound decisions. Additionally, the use of automated systems also facilitates collaboration between the finance team and other departments within the company, thereby accelerating financial processes and improving mutual understanding of the company's financial situation [22].

This research aligns with previous studies stating that digital technologies such as IoT sensors, RFID tags, AI-based analytics, and cloud-based systems are fundamentally reshaping the way businesses monitor, forecast, and optimize their inventory. These technologies offer significant benefits, including improved visibility, better accuracy, enhanced demand forecasting, and more efficient collaboration. The transformative potential of digital technology allows organizations to adapt to dynamic market conditions and meet customer demands more effectively. By leveraging real-time data and advanced analytics, businesses can make informed decisions that drive strategic inventory policies, reduce costs, and improve overall performance. The proper use of technology will boost company performance, particularly its financial performance [10].

CONCLUSION

Fundamental Finding : The results of this study indicate that, first, there is no effect of the digital inventory control system variable on inventory turnover. Second, it was found that there is an effect of the digital inventory control system variable on gross profit margin. Third, there is an effect of the digital inventory control system variable on net profit margin. Fourth, it was found that there is an effect of the digital inventory control system variable on return on assets. Fifth, it was found that there is an effect of the digital inventory control system variable on financial performance. **Implication :** The results of this study indicate that, first, there is no effect of the digital inventory control system variable on inventory turnover, suggesting that technology-based inventory control does not necessarily optimize operational rotation but does contribute to financial performance improvements. Second, it was found that there is an effect of the digital inventory control system variable on gross profit margin, third, an effect on net profit margin, and fourth, an effect on return on assets, indicating that the adoption of AI, IoT, and RFID-based systems enhances various aspects of financial outcomes. Fifth, it was found that there is an effect of the digital inventory control system variable on financial performance, implying that digitalization in inventory control can support better profitability and asset utilization for retail companies. **Limitation :** This study does not explicitly present limitations within the conclusion section, but the findings are bounded by the variables tested, where the results of this study indicate that, first, there is no effect of the digital inventory control system variable on inventory turnover, while effects were

found on gross profit margin, net profit margin, return on assets, and financial performance, suggesting that the study focuses only on selected operational and financial indicators and may not capture broader operational dynamics influenced by digital systems. **Future Research :** For future researchers, it is recommended to analyze other factors that influence company performance. A more in-depth analysis using panel data analysis can be used to examine how internal control systems affect operational and financial performance in each company.

ACKNOWLEDGEMENTS

Praise be to God Almighty for His abundant grace and blessings, which have enabled the author to complete this thesis as one of the requirements for obtaining a bachelor's degree. The author expresses deepest gratitude to their parents for their unwavering prayers, love, support, and encouragement; this work is dedicated as a token of appreciation for their countless hard work and sacrifices. The author also expresses gratitude to their siblings and nieces/nephews who consistently provided encouragement, motivation, and cheerfulness, enabling the author to persevere until the end. Thank you to my friends who were present in both good times and bad, always ready to help whenever needed, and who brought joy to make the process of writing this thesis lighter and more enjoyable—your support and companionship mean so much to the author. The author realizes this thesis is far from perfect; any constructive criticism and suggestions are highly appreciated for future improvement, and hopefully, this work will be beneficial to readers and the advancement of knowledge.

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