LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-ISSN:1855-363X
VOL. 23, NO. S2(2025)

INVENTORY MANAGEMENT AND PRODUCTIVITY IN THE FISHING INDUSTRY: A QUANTITATIVE STUDY IN WAREHOUSES OF NORTHERN PERU

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Abstract
This study examines the relationship between inventory management and productivity in an industrial fishing company, assessing dimensions such as procurement, stock control, maintenance, storage, efficiency, and effectiveness. Using a quantitative correlational approach and Spearman’s coefficient, significant associations were identified, particularly in storage, maintenance, and efficiency. Findings are critically compared with recent literature (2022–2025), revealing convergence on the positive impact of lean practices, emerging technologies, and sustainable models, as well as divergences arising from sector-specific contexts. The study offers practical implications for optimizing logistics processes and theoretical contributions for integrating sustainability and digitalization into inventory management in fishing and industrial sectors.

Keywords: inventory management, productivity, warehouse, fishing company

INTRODUCTION

At a global scale, inventory constitutes a strategic pillar of business management, insofar as its proper administration exerts a direct influence on productivity, profitability, and competitiveness. As Montelongo et al. (2019) observe, on average, 70% of companies’ current assets are tied up in inventory, thereby representing both a substantial investment and a significant risk if not managed efficiently. Consequently, inventory management must rely on meticulous planning and rigorous control. These practices aim to maximize return on investment, reduce superfluous costs, and ensure uninterrupted productive, commercial, and logistical operations.

In Latin America, companies encounter analogous challenges, further exacerbated by contexts of informality, limited resources, and low levels of technological adoption. As Muñoz (2024) asserts, efficient management can increase inventory turnover by up to 10% and reduce costs by between 10% and 40%, thereby fostering continuous production and enhancing customer service. Nevertheless, a considerable number of organizations still rely on manual control methods, which in turn give rise to errors, inefficiencies, and a loss of competitiveness in an increasingly demanding and digitally driven global market.

One of the most recurrent challenges within organizations is the imbalance between inventory surplus and stockouts. As Montelongo et al. (2019) contend, ineffective inventory management can lead to the loss of both sales and customers. In the case of the analyzed fishing company, this issue materializes through the use of manual control procedures based on spreadsheets, which in turn result in data duplication, errors, and time wastage. Such circumstances constrain the organization's responsiveness and undermine decision-making processes in both production and order fulfillment.

The root of this situation lies in the absence of an automated software control system, the use of obsolete equipment, untrained personnel, and the lack of forward planning based on historical data. These underlying causes give rise to consequences such as inaccurate records, delivery delays, incomplete shipments, and diminished efficiency in operational processes. Moreover, the limited visibility of available stock hinders precise and timely management, thereby resulting in low warehouse productivity and directly undermining the company's competitiveness in both local and international markets.

Consequently, the following overarching research question was formulated: What is the relationship between inventory management and the productivity of the warehouse area in a fishing company located in northern Peru?Building upon this question, the general objective was established as measuring the relationship between inventory management and the productivity of the warehouse area in a fishing company in northern Peru.

THEORETICAL FRAMEWORK

Inventory management is understood as a systematic and planned process encompassing the efficient procurement, storage, and commercialization of raw materials, components, and finished goods, while adhering to appropriate criteria regarding stock levels, lead times, and costs (Ugbebor et al., 2024). From a logistical perspective, this function aims to ensure the continuous availability of inputs and goods, while simultaneously minimizing operating costs and preventing stockout situations that could jeopardize operational continuity (Errasti, 2012). Complementing this operational focus is its strategic component, which is directed toward the rational control of inventory through specialized techniques that mitigate economic losses arising from both surpluses and shortages (Fernández, 2018), thereby consolidating inventory management as a fundamental activity within the business operational dynamics.

In the economic domain, productivity is conceived as a key performance metric that links the quantity of goods or services produced to the inputs required for their creation (Li & Chen, 2021). This conception transcends individual labor efficiency and encompasses the optimal utilization of material, technological, and temporal resources. In this regard, productivity encapsulates the relationship between outputs achieved and inputs employed, thereby constituting an essential indicator for assessing operational performance. Consequently, it becomes an analytical tool that enables the measurement of the rational use of available resources and its direct impact on organizational achievements (Ruiz, 2022).

In the specific context of fishing companies, inventory management plays a decisive role by enabling the identification and control of available stock through the appropriate classification of inputs and products, thus ensuring timely and continuous supply (Meana, 2017). This practice is indispensable for maintaining the stability of the production cycle, securing alignment between supply and demand, and preventing operational disruptions (Velayati et al., 2024). Moreover, maintaining up-to-date inventory records facilitates the optimization of strategic decision-making, ensures compliance with fiscal regulations related to opening and closing inventory values, and enhances the overall profitability of the business.

From a sectoral perspective, productivity in fishing activities is analyzed by considering technical variables such as engine power, vessel size, or the duration of fishing days, in relation to the total catch volume (Naevdal, 2022). Within this framework, technical and economic efficiency emerge as key indicators for assessing the degree to which available resources are utilized. A technically efficient operation lies on the production possibility frontier, whereas an economically efficient operation additionally succeeds in minimizing associated costs. Therefore, productivity is not merely a measure of production volumes but also reflects the quality of the strategic decisions implemented to achieve them, exerting a direct influence on business sustainability.

The general theory of inventory management conceptualizes this process as a rational, structured, and dynamic approach aimed at controlling the flow of goods within the organization, with the purpose of optimizing stock levels, locations, and replenishment times, while reducing waste and enhancing logistical efficiency (Manousiadou, 2024).

Productivity, as a central measure of economic performance, enables the quantification of how many goods or services can be generated from a given amount of resources, thereby underscoring its fundamental role in strengthening organizational growth and in assessing overall efficiency (Pan et al., 2022; Ruiz, 2022). Likewise, the concept of marginal product is employed to describe the additional output obtained by incorporating a new production factor while holding all others constant (Zhang et al., 2021). Building on this notion, a distinction is drawn between labor productivity—which evaluates individual or group performance relative to a specific workload—and total factor productivity, which accounts for the entire set of resources involved in the process. This analytical differentiation is crucial for identifying sources of inefficiency, assessing the relative contribution of each resource, and designing improvement strategies aimed at optimizing organizational processes.

From an operational perspective, inventory management is structured around four fundamental dimensions: procurement, stock control, maintenance, and storage (Panigrahi et al., 2024). Procurement ensures the continuous availability of essential materials for production; stock control regulates available quantities and monitors the minimum and maximum levels required to prevent interruptions (Zermati, 2004). Maintenance guarantees that infrastructure and facilities operate effectively, while orderly and accessible storage facilitates the efficient distribution of finished products (Meana, 2017). Collectively, these dimensions are interrelated with other logistical processes and determine the overall efficiency of the supply chain. Efficient inventory management also necessitates the implementation of integrated control systems that enable the automation and optimization of logistical operations without compromising business profitability or generating unnecessary overhead costs (Beusch et al., 2022).

Conversely, productivity is also articulated around operational dimensions such as efficiency and effectiveness. Efficiency refers to the optimal utilization of available resources in relation to the outcomes achieved—namely, the ability to produce more with fewer inputs (Long, 2021). Effectiveness, in contrast, focuses on the achievement of established objectives, regardless of the resources employed. These two dimensions are complementary: whereas efficiency emphasizes the means, effectiveness is oriented toward the ends. Their integration within a business strategy facilitates the identification of bottlenecks, the adjustment of internal processes, and the maximization of organizational outcomes. In this regard, aligning robust inventory management with a comprehensive productivity approach strengthens the overall performance of the organization, particularly in sectors such as fisheries, where margins for error are narrow and competitiveness hinges on the precise management of resources.

PREVIOUS STUDIES

In the domain of inventory management and productivity, Delfín-Ortega and Navarro-Chávez (2015), through the application of the Malmquist index to Mexican container terminals, demonstrated that increases in total factor productivity stemmed primarily from technological advancements, therefore suggesting the need to strengthen both infrastructure and public-administrative management. In a complementary line, Bubber, Babber, Shashi, and Jain (2023) showed, via a structural equation modeling approach, that people-oriented *lean* practices not only enhance process quality but also optimize inventory management, ultimately boosting productivity. Likewise, Nobil, Cárdenas-Barrón, Garza-Núñez, Treviño-Garza, Céspedes-Mota, Loera-Hernández, Smith, and Nobil (2024) incorporated elements such as warm-up processes, shortage management, and carbon emissions into a sustainable inventory model, concluding that the cost of carbon trading significantly affects both total costs and profitability. Similarly, Kaur and Prakash (2025), employing *Deep Reinforcement Learning* and modeling the system as a Markov decision process, succeeded in reducing stockouts and expiration-related waste within the pharmaceutical supply chain, thereby increasing both profitability and patient coverage. Finally, Kapoor, Lee, Sikora, and Piramuthu (2024) verified, through an analytical model and simulations, that the combined use of drones and RFID tagging in perishable goods inventories reduces spoilage-related waste and enhances operational efficiency, benefiting both operators and customers within the supply chain.

In recent literature on inventory management, Gonçalves de Souza, Mlinar, Van den Broeke, and Creemers (2025) provided an exhaustive analysis of 278 studies on dynamic programming, classifying problems and methodologies, and identifying that the integration of sustainability and technology constitutes a field with considerable potential for future applications. In a convergent line, Puga Mendoza, Caballero Chávez, and Torres Mendoza (2025) conducted a systematic review of IoT applications in inventory and warehouse management (2017–2023), revealing the predominance of theoretical frameworks and algorithms over practical implementations, as well as a notable concentration of scientific output in Asia. Complementarily, Aiello, Muriana, Quaranta, and Abusohyon (2025) developed a sustainable inventory model for closed-loop supply chains, based on the 4R framework, which reduced surplus inventory by 65% and waste generation, albeit with a 26.2% decrease in profits—reflecting the cost of circularity. In turn, Ding, Liu, Chen, and Kozan (2025) proposed a two-echelon inventory model for coal port terminals with mining sites, incorporating carbon emission costs and solving it through an enhanced Wagner–Whitin algorithm, thereby demonstrating that lower carbon prices increase production and optimize inventory levels. Finally, Villegas-Chá, Maldonado Navarro, and Sánchez-Viteri (2024) validated, in a real-world environment, a computer vision and machine learning platform based on convolutional neural networks, reducing inventory counting time by 45% and improving accuracy by 9%, thus highlighting its potential to optimize management compared to traditional methods.

Several studies have examined the relationship between inventory management and organizational performance across different productive sectors. First, Contreras et al. (2022) conducted a bibliographic review focused on the textile industry, identifying that the proper implementation of inventory systems enhances productivity by controlling inputs and reducing logistical errors. Based on this, they concluded that efficient inventory methods improve industrial performance and enable enterprise to address the challenges of the Latin American market. Complementarily, Bravo (2023) analyzed the application of the *Just in Time* system as a strategy to optimize business productivity. His study revealed that this methodology reduced logistical costs by more than 15% and significantly improved operational flow. Consequently, he concluded that this model increases efficiency by minimizing idle inventories and synchronizing supply with actual demand. Likewise, Arana et al. (2022) assessed the relationship between inventory management and profitability in an industrial company, finding that 59.5% of the variability in profitability was explained by inventory control. In this regard, they highlighted that implementing systematic policies for purchasing, turnover, and stock classification significantly enhances economic productivity.

In the agro-industrial sector, Becerra and Fernández (2025) explored how inventory management affects warehouse productivity. They found a 13% increase in operational efficiency after optimizing stock control and concluded that automation and continuous inventory review contribute to reducing losses and improving logistical performance. Similarly, Angulo-Murillo et al. (2023) analyzed the impact of inventory control on profitability in the pharmaceutical sector in Manta, revealing the absence of standardized processes and significant losses due to stock disorganization. Consequently, they concluded that establishing clear inventory policies improves internal efficiency and increases financial productivity through continuous control and appropriate product rotation. In a similar vein, Ghazi et al. (2023) evaluated the implementation of an automated inventory system in Alfa Company, reporting a 30% reduction in storage costs and a 25% increase in logistical efficiency. Based on these results, they argued that automation improves stock control, reduces human error, and strengthens productivity, particularly in small and medium-sized enterprises.

In contrast, Odumusor (2024) examined how variables such as inventory availability, accuracy, and coverage influence the productive efficiency of Nigerian manufacturing enterprises. The findings revealed significant effects ($\beta = 0.668$; $\beta = 0.267$; $\beta = 0.117$) on productivity, leading the author to conclude that rigorous inventory management minimizes disruptions, optimizes processes, and improves organizational performance through better coordination and resource planning. In turn, Balkhi et al. (2022) investigated the effectiveness of the *Just-in-Time* (JIT) system in a hospital context, finding that this strategy significantly reduced waste and enhanced resource efficiency by eliminating excess inventory. However, they cautioned that while JIT is valuable in stable contexts, it limits responsiveness in times of crisis, which may jeopardize the continuity of essential services. In another study, Kesumo et al. (2024) analyzed the influence of inventory control on labor productivity in the logistics area of PT Duta Sentosa Yasa. They found a significant positive correlation of 59.9% between the two variables, concluding that effective inventory control helps reduce losses, improve dispatch accuracy, and strengthen the performance of operational personnel. Finally, Sunday and Ejechi (2022) investigated the impact of specific inventory practices—such as record accuracy, the implementation of *lean* systems, and the use of information technologies—on business productivity. Although they identified positive effects for almost all practices, they observed an exception in reserve stock management. Nevertheless, they concluded that improving inventory processes reduces lead times, eliminates unnecessary excess, and increases operational efficiency in the manufacturing sector.

METHODOLOGY

The study adopted a quantitative approach, aimed at the statistical measurement of variables through the collection of numerical data, with the purpose of validating theoretical propositions. The design was non-experimental, as the variables were not manipulated but rather observed in their real-world context. The level was correlational, given its focus on identifying relationships between concepts within a defined setting, while the type was cross-sectional and applied, since data were collected at a single point in time using questionnaires administered to employees of a private company. The study population consisted of 50 logistics department staff members from the fishing company, encompassing both operational personnel and middle management. As this was a finite and accessible population, a census sampling method was employed, surveying the entire workforce to ensure comprehensive and accurate representation of the phenomenon under investigation.The chosen technique was the survey, implemented through a 30-item Likert-type questionnaire validated by expert judgment, whose reliability was confirmed with a Cronbach’s alpha coefficient of 0.838. Data were initially processed in Excel and subsequently in SPSS version 25, where the Kolmogorov–Smirnov normality test was applied. As normality was not assumed, Spearman’s rho coefficient was used to analyze the relationship between variables. Ethical principles were upheld throughout the research, ensuring informed consent, data confidentiality, and compliance with institutional regulations. The study was rendered feasible by the availability of resources, the company’s authorization, and the researchers’ competence to carry it out.

RESULTS

Inventory Management Variable

The inventory management variable was assessed through four key dimensions: procurement, stock control, maintenance, and storage, which collectively enable a comprehensive analysis of the warehouse area’s logistical processes. The following presents the results obtained for each component, with the aim of identifying strengths, weaknesses, and their relationship to organizational productivity.

Table 1

Frequencies of the Procurement Dimension.

Response Category	Goods Receipt Policies	Timely Entry of Materials	Unrequested Products	Verification of Product Quantities	Delivery Planning	Average Dispatch Time	Contingency Plan in Case of Delays	Top List of Best Selling Products
Strongly Disagree	7 (14.0%)	0 (0.0%)	2 (4.0%)	2 (4.0%)	2 (4.0%)	2 (4.0%)	0 (0.0%)	0 (0.0%)
Disagree	29 (58.0%)	10 (20.0%)	27 (54.0%)	0 (0.0%)	0 (0.0%)	5 (10.0%)	12 (24.0%)	5 (10.0%)
Neither Agree nor Disagree	12 (24.0%)	17 (34.0%)	12 (24.0%)	10 (20.0%)	10 (20.0%)	10 (20.0%)	10 (20.0%)	19 (38.0%)

Agree	2 (4.0%)	23 (46.0%)	7 (14.0%)	24 (48.0%)	28 (56.0%)	28 (56.0%)	21 (42.0%)	24 (48.0%)
Strongly Agree	0 (0.0%)	0 (0.0%)	2 (4.0%)	14 (28.0%)	10 (20.0%)	5 (10.0%)	7 (14.0%)	2 (4.0%)
Total	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**

The results for the procurement dimension reveal a predominantly critical perception regarding goods receipt policies, with 57.14% expressing disagreement, thereby indicating an initial weakness in the supply chain. In contrast, a more favorable evaluation is observed for variables such as delivery planning (57.14% agreement) and average dispatch time (57.14% agreement), suggesting operational efficiency once the intake stage has been completed. The top list of best-selling products reflects only limited awareness of product turnover rates (47.62% agreement), which could limit decision-making based on product turnover. The presence of neutral responses in unrequested products and contingency plan points to gaps or uncertainty in the management of unforeseen events. Overall, this component portrays a fragmented approach to procurement: while certain logistical practices perform effectively, others exhibit structural shortcomings that may hinder productivity. Strengthening initial planning and enhancing traceability would serve to optimize process efficiency.

Table 2

Frequencies for the Stock Control Dimension

Response Category	**Products Not Listed on Delivery Note Invoice**	**Goods Recording**	**Stockout Occurrence**	**Stockout Replenishment**
Strongly Disagree	10 (20.0%)	2 (4.0%)	19 (38.0%)	0 (0.0%)
Disagree	25 (50.0%)	0 (0.0%)	21 (42.0%)	5 (10.0%)
Neither Agree nor Disagree	10 (20.0%)	5 (10.0%)	10 (20.0%)	19 (38.0%)
Agree	5 (10.0%)	24 (48.0%)	0 (0.0%)	19 (38.0%)
Strongly Agree	0 (0.0%)	19 (38.0%)	0 (0.0%)	7 (14.0%)
Total	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**

The stock control dimension reveals a predominantly negative perception, particularly in critical variables such as stockout occurrence (38.1% strongly disagree and 42.9% disagree), indicating frequent shortages. The item products not listed on delivery note or invoicelikewise highlights deficiencies, with 52.4% in disagreement and only 9.52% in agreement, which may translate into serious accounting and logistical risks. While progress is acknowledged in goods recording (38.1% strongly agree and 47.6% agree), this achievement does not appear sufficient to ensure an effective system, as stockout replenishment registers 38.1% neutral responses. The overall correlation of this component with productivity was weak and statistically insignificant, confirming that, despite isolated efforts, the stock control system has yet to consolidate as a lever of efficiency. A comprehensive digitalization process and systematic controls are therefore required

Table 3
Frequencies for the Maintenance Dimension

Response Category	**Maintenance of Sensitive Products**	**Sensitive Products**	**Equipped Warehouses**	**Maintenance of Shelves and designated storage areas**
Strongly Disagree	0 (0.0%)	2 (4.0%)	0 (0.0%)	2 (4.0%)
Disagree	0 (0.0%)	7 (14.0%)	2 (4.0%)	5 (10.0%)
Neither Agree nor Disagree	14 (28.0%)	5 (10.0%)	22 (44.0%)	19 (38.0%)
Agree	31 (62.0%)	31 (62.0%)	21 (42.0%)	12 (24.0%)
Strongly Agree	5 (10.0%)	5 (10.0%)	5 (10.0%)	12 (24.0%)
Total	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**

The maintenance dimension reflects predominantly positive perceptions in variables such as sensitive products and maintenance of products, where more than 61.9% of respondents expressed agreement. However, there is an ambiguous response regarding the condition of equipped warehouses, with 42.86% positioned neutrally, suggesting partial coverage or a lack of standardization in infrastructure. The variable maintenance of shelves and designated storage areaslikewise reveals dispersed opinions: 38.1% remain neutral, while 23.81% already express satisfaction with current maintenance practices. This ambiguity may stem from the absence of institutionalized policies or from reactive, rather than preventive, maintenance approaches. The moderate and statistically significant correlation obtained between this component and productivity ($\rho = 0.449$, $p = 0.041$) demonstrates that maintenance exerts a real and tangible impact on warehouse performance. It is therefore recommended to strengthen technical routines and document processes in order to standardize and ensure their effectiveness.

Table 4
Frequencies for The Storage Dimension

Response Category	**Products Properly Distributed and Signposted**	**Product Rotation**	**Periodic Improvements**	**Warehouse order is optimal**
Strongly Disagree	0 (0.0%)	2 (4.0%)	0 (0.0%)	0 (0.0%)
Disagree	5 (10.0%)	0 (0.0%)	5 (10.0%)	5 (10.0%)
Neither Agree nor Disagree	21 (42.0%)	12 (24.0%)	18 (36.0%)	14 (28.0%)
Agree	14 (28.0%)	31 (62.0%)	17 (34.0%)	24 (48.0%)
Strongly Agree	10 (20.0%)	5 (10.0%)	10 (20.0%)	7 (14.0%)
Total	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**

The storage dimension presents predominantly favorable results. A total of 61.9% of respondents acknowledge adequate product rotation, and 47.62% rate warehouse order as optimal. Moreover, periodic improvements to the storage system were confirmed by 52.38% (combining "agree" and "strongly agree" responses), reflecting an organizational culture oriented toward continuous improvement. Nevertheless, 38.1% remain neutral regarding the signposting and distribution of products, which may imply inconsistencies in visual cues or categorization. The moderate and statistically significant correlation (ρ = 0.540, p = 0.012) between this category and productivity underscores its pivotal role in logistical performance. An efficient storage system reduces search times, improves dispatch accuracy, and ensures traceability. The positive trend indicates that the company has made substantial progress in this area, although reinforcing labeling, logical order, and ergonomics is recommended to maximize operational efficiency.

Productivity Variable

The productivity variable was assessed through two fundamental components: efficiency and effectiveness, which together allow for a comprehensive measurement of the warehouse area's operational performance. The efficiency component focused on optimizing resource utilization and the ability to fulfill orders without errors or delays, whereas the effectiveness aspect evaluated the achievement of operational targets such as on-time dispatches and the correct distribution of products. The following section presents the results obtained for each of these dimensions, which reflect the level of logistical performance achieved by the organization during the study period.

Table 5

Frequencies for The Efficiency Dimension

Response Category	Impediment to Perfect Dispatches	Report on Perfect Dispatches	Resources for Order Volume	Resources to Fulfill an Order	Training for Order Preparation	Difficulties in Order Preparation
Strongly Disagree	0 (0.0%)	0 (0.0%)	2 (4.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Disagree	7 (14.0%)	7 (14.0%)	2 (4.0%)	5 (10.0%)	14 (28.0%)	14 (28.0%)
Neither Agree nor Disagree	19 (38.0%)	14 (28.0%)	14 (28.0%)	23 (46.0%)	7 (14.0%)	17 (34.0%)
Agree	19 (38.0%)	29 (58.0%)	27 (54.0%)	17 (34.0%)	19 (38.0%)	14 (28.0%)
Strongly Agree	5 (10.0%)	0 (0.0%)	5 (10.0%)	5 (10.0%)	10 (20.0%)	5 (10.0%)
Total	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**

The efficiency category displays a response distribution that reveals both critical areas and others with favorable performance. In variables such as resources for order volume and resources to fulfill an order, more than 50% of respondents indicated agreement, denoting acceptable operational availability. However, 47.62% remained neutral in the latter, which may reflect uncertainty regarding the regularity or sufficiency of such resources. With respect to training for order preparation and difficulties in order preparation, responses are dispersed: 28.57% in disagreement but also 38.1% in agreement. This contrast suggests that technical training is intermittent or selectively targeted, thereby affecting performance consistency. The moderate correlation obtained ($\rho = 0.449$, $p < 0.05$) indicates that efficiency is significantly related to productivity. To reinforce this impact, it is necessary to enhance systematic training and ensure the continuous availability of both physical and human resources throughout the entire logistical process.

Table 5

Frequencies for The Effectiveness Dimension

Responses Category	**Compliance with Dispatches**	**Compliance with Dispatch Schedules and Dates**	**Time to Place Products in their designated storage areas**	**Product Distribution Usin The System**
Strongly Disagree	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Disagree	0 (0.0%)	5 (10.0%)	25 (50.0%)	10 (20.0%)
Neither Agree nor Disagree	12 (24.0%)	19 (38.0%)	21 (42.0%)	10 (20.0%)
Agree	36 (72.0%)	24 (48.0%)	2 (4.0%)	20 (40.0%)
Strongly Agree	2 (4.0%)	2 (4.0%)	2 (4.0%)	10 (20.0%)
Total	**50 (100%)**	**50 (100%)**	**50 (100%)**	**50 (100%)**

The effectiveness component yielded predominantly positive results, particularly in the item compliance with dispatches, where 71.43% agreed and 4.76% strongly agreed. This trend confirms a high level of operational compliance in meeting deadlines and deliveries. Similarly, compliance with schedules and dates and distribution using the system received positive responses exceeding 50%, indicating confidence in logistical planning. However, time to place products in designated storage areas emerged as one of the variables with the highest levels of dissatisfaction: 47.62% disagreed and 42.86% remained neutral. This specific aspect points to a potential weakness in internal organization or in the allocation of space and time. Effectiveness, as anaspect focused on the achievement of objectives, remains high yet exhibits a clear margin for improvement in the final storage stage. It is therefore recommended to redesign the inflow process to designated storage areasin order to reduce bottlenecks and enhance overall effectiveness.

Table 6
Inferential Results

Objective	Independent Variable	Dependent Variable	Spearman's Rho	Sig. (p-value)	Significance Level	Relationship	Statistical Interpretation
General	Inventory Management	Productivity	0.595**	0.004	0.01	Moderate positive	Significant
Specific 1	Procurement	Productivity	0.474*	0.03	0.05	Moderate positive	Significant
Specific 2	Stock Control	Productivity	0.266	0.244	—	Weak positive	Not significant
Specific 3	Maintenance	Productivity	0.449*	0.041	0.05	Moderate positive	Significant
Specific 4	Storage	Productivity	0.540*	0.012	0.05	Moderate positive	Significant

The results show that inventory management in its various dimensions (procurement, maintenance, storage) has a positive and significant relationship with warehouse productivity in the fishing company located in northern Peru. The highest correlation (0.595) is observed between overall inventory management and productivity, indicating a moderate and highly significant relationship (p = 0.004).
Likewise, moderate and significant correlations are identified with the variables of procurement, maintenance, and storage, with Rho values ranging between 0.449 and 0.540, confirming that their effective management positively influences productivity.
In contrast, stock control presents a weak correlation (0.266) and is not statistically significant (p = 0.244), suggesting that this specific aspect does not significantly impact productivity, at least in this sample. Taken together, the findings support the general hypothesis: better inventory management tends to be associated with higher productivity, highlighting specific areas where companies can concentrate their improvement efforts.

DISCUSSION
The results of this study confirm that inventory management is a relevant determinant of productivity but also reveal asymmetries in the relative weight of its dimensions. The moderate correlation between inventory management and productivity (ρ = 0.595, p = 0.004) supports the conclusions of Contreras et al. (2022) and Bravo (2023) regarding operational efficiency and cost reduction associated with demand-driven management. However, unlike Bravo—who reports consistent impacts from the Just-in-Time model—our findings suggest that without solid goods receipt policies, a deficit identified in 57.14% of cases, synchronization between procurement and demand may be compromised, aligning with the warnings of Balkhi et al. (2022) on JIT's vulnerability to disruptions.
In the procurement aspect, the significant correlation (ρ = 0.474, p = 0.030) is consistent with Arana et al. (2022) on its influence on profitability. However, our data reveal that while delivery planning is consistent, goods receipt policy remains fragile, suggesting that the positive impact can be diluted along the supply chain. This contrasts with the

comprehensive approach of Sunday and Ejechi (2022), who observe transversal improvements when lean strategies are applied across all inventory phases.

Stock control, despite its strategic importance, did not present a significant correlation (ρ = 0.266, p = 0.244), in contrast to Kesumo et al. (2024) and Ghazi et al. (2023), who found strong associations when automation and traceability were integrated. This finding reinforces the conclusions of Angulo-Murillo et al. (2023) on losses arising from disorganization and lack of standards, suggesting that in contexts like the one studied, improvements require technological investment and regulatory restructuring.

Maintenance showed a significant correlation (ρ = 0.449, p = 0.041), supporting Becerra and Fernández (2025) and Odumusor (2024) on the relevance of preventive routines. However, the ambiguity in the assessment of equipped warehouses indicates that, while there is a maintenance culture for products, infrastructure is not always optimized, limiting the positive effect observed.

The storage dimension, with the highest correlation (ρ = 0.540, p = 0.012), supports the literature on the importance of spatial organization (Contreras et al., 2022) and the reduction of idle inventory (Bravo, 2023). Nonetheless, deficiencies in signposting indicate that the full potential of this aspect is not being realized, in line with Delfín-Ortega and Navarro-Chávez's (2015) warning on the need to strengthen infrastructure to maximize productivity.

Regarding efficiency ($\rho = 0.449$, $p < 0.05$), the findings are consistent with Becerra and Fernández (2025) and Ghazi et al. (2023) in that automation optimizes time and reduces errors. However, the disparity in training detected suggests that, as noted by Odumusor (2024), the benefits are only consolidated when continuous training policies are integrated.

Finally, effectiveness showed positive descriptive indicators, consistent with Sunday and Ejechi (2022), but bottlenecks in the *time to place products in designated storage areas*reveal critical areas that lean systems do not always address, as Balkhi et al. (2022) warn regarding JIT's fragility without robust operational support.

Comparison with frontier studies reinforces this reading. Bubber, Babber, Shashi, and Jain (2023) demonstrate that people-centered lean practices enhance inventory management and productivity, yet our data indicate that without alignment across all phases (receiving, control, storage), their effect is partial. Nobil et al. (2024) and Ding et al. (2025) underscore that integrating sustainability and carbon costs into inventory management delivers efficiency and resilience; although our study did not address this component, the lack of stock control and signposting suggests that operational sustainability remains a challenge. Similarly, the technological solutions proposed by Kaur and Prakash (2025), Kapoor et al. (2024), Gonçalves de Souza et al. (2025), and Villegas-Chá et al. (2024) demonstrate significant improvements when IoT, AI, or computer vision are adopted, aligning with our conclusion that digitalization is key to transforming critical dimensions such as control and storage.

In summary, our results confirm the relevance of inventory management for productivity but also reveal that its impact is uneven across dimensions, and that full alignment requires not only lean practices and maintenance routines but also digitalization, process standardization, and preventive policies—elements that the most recent literature identifies as essential for achieving sustainable advantages.

Implications for Inventory Management in the Latin American Industrial Context and for Organizational Theory

The findings of this study have important implications for both managerial practice and theoretical development in the field of inventory management. In the Latin American industrial context—characterized by high demand volatility, logistical constraints, and technological gaps—the results suggest that prioritizing dimensions such as storage, maintenance, and efficiency not only enhances productivity but also mitigates operational risks associated with supply disruptions and variability in delivery times. The integration of emerging technologies—such as computer vision systems, IoT, and AI-based optimization models—represents a strategic opportunity to reduce deterioration losses, increase traceability, and improve responsiveness to market fluctuations. However, their implementation requires overcoming common regional barriers, such as low investment in digital infrastructure and organizational resistance to change.

From the perspective of organizational theory, the results reinforce the need to expand classical inventory management models by incorporating sustainability and digitalization as strategic variables that interact with productivity. This entails moving beyond cost-focused conceptions toward integrated frameworks that consider product life cycles, environmental impact, and the organization's adaptive capacity. Furthermore, it highlights the relevance of developing hybrid theories that integrate lean practices with circular economy models and knowledge management, aligning operational efficiency with organizational resilience in high-uncertainty environments.

These findings diverge from Kesumo et al. (2024), possibly due to the manual nature of stock control in the case study company, which contrasts with the automated systems implemented in their research context.

CONCLUSIONS

The empirical evidence analyzed demonstrates that efficient inventory management has a significant relationship with warehouse productivity in the fishing company studied. The dimensions of storage, maintenance, efficiency, and procurement exhibited moderate and significant correlations, confirming that improving these aspects can translate into tangible increases in operational performance. In particular, adequate product rotation, preventive maintenance, and resource availability strengthen logistical processes and reduce unproductive times.

Conversely, the stock control category did not show a significant correlation with productivity, suggesting that despite isolated efforts such as goods recording, deficiencies persist in traceability, timely replenishment, and documentary control of inventory. This finding indicates that recording inflows and outflows is insufficient; a systematic, automated, and cross-cutting approach is required for this aspect to have a real impact on productivity levels.

The study's implications highlight the need to prioritize investments in technology, operational training, and structural inventory planning. An integrated and articulated vision of inventory management not only strengthens internal efficiency but also improves the organization's capacity to respond to changing environments and variable demand.

The study is limited by the small sample size, which restricts the generalization of results to other industrial sectors. Furthermore, the quantitative approach prevents in-depth exploration of operational staff's subjective perceptions of inventory practices, which could provide relevant nuances to the overall analysis.

It is recommended to implement automated inventory systems that integrate real-time control and operational traceability. Future research could expand the sample to companies in other sectors and combine quantitative and qualitative methodologies to analyze the strategic impact of inventory management from a broader organizational perspective.

In essence, this study helps fill the gap identified in the literature on inventory management in Latin American industrial contexts by integrating empirical analysis with a critical review of technological, sustainable, and operational approaches. By demonstrating the differentiated impact of dimensions such as storage, maintenance, and efficiency on productivity, it offers an interpretive framework that combines quantitative findings with practical implications for the region. Future research should delve deeper into inventory modeling under high-uncertainty scenarios and explore the gradual adoption of emerging technologies, assessing their effect not only on operational efficiency but also on organizational resilience and supply chain sustainability.

By focusing on the fishing industry in northern Peru, this study addresses a sector and geographic gap in the literature on inventory management. Future research should explore the integration of predictive analytics and sustainability metrics into inventory systems to enhance both operational efficiency and environmental performance.

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