WAREHOUSE PRODUCTIVITY IN THE DAIRY AGRO-INDUSTRY: KEY INFLUENCING FACTORS

TRI HARDI, SYARIF IMAM HIDAYAT, HAMIDAH HENDRARINI AND TAUFIK SETYADI

SUMMARY

In today's highly competitive global market, companies must find new ways to add value for their customers. Consequently, with the ever-changing dynamics of the global market, companies must compete with rival firms in terms of products, costs, quality, and services. This, in turn, has driven the development of logistics systems that are more sophisticated than traditional ones. The establishment of a warehouse should have economic benefits. Economic benefits can be achieved by increasing warehouse productivity through improved efficiency in warehouse operations. Essentially, the warehouse should be seen as a temporary place to store goods to meet customer demand in a timely and cost-effective manner. With rising operational costs, concepts such as Just-In-Time (JIT) and pull system models, among others, have emerged. These concepts are aimed at minimizing the amount of stored inventory and speeding up the production process so that operational costs can be controlled. The aim of this study is to analyze the factors influencing warehouse productivity in a dairy agro-industry. The analytical method used in this research is the MICMAC (Matrice d'impacts croisés-multiplication appliquée) method, developed by the LIPSOR Prospective (Foresight) Strategic and Organizational Research Laboratory. This research aims to enhance knowledge about the factors influencing warehouse productivity. Therefore, it can serve as guidance for innovation and improvement not only in the dairy agro-industry but also in similar industries across other regions.

Introduction

Currently, in a highly competitive global market, companies are required to find new ways to provide added value to customers. Therefore, with changing market dynamics worldwide, companies are compelled to compete with rival firms in terms of products, costs, quality, and service. This shift has led to the development of more sophisticated logistics systems compared to traditional ones. Logistics has transformed from a purely operational function into a strategic enterprise-level component over the past two decades. Effective logistics management across the entire organization contributes to cost reduction and improved delivery services (IIMM, 2020).

Within a logistics system, warehousing represents a crucial component. The establishment of a warehouse must generate economic benefits. Such benefits can be attained by increasing warehouse productivity through improved efficiency in warehouse operations. Nowadays, many stakeholders perceive warehouses and distribution centers as unnecessary links in the supply chain,

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viewing them merely as cost centers. However, a warehouse should be considered a temporary storage facility intended to meet customer demand in a timely and cost-effective manner. In today's market, characterized by high costs for land, buildings, labor, and energy, and the adoption of concepts such as Just-In-Time (JIT), companies continuously explore ways to minimize stored inventory and accelerate production processes. This shift has led many companies to transition from a push system to a pull system, where consumer demand dictates production. By adopting this model, internal inventory can be minimized. In the past, market conditions differed—producers and retailers focused on maximizing sales, which required large inventories and warehouse capacity (Richard, 2014).

For the establishment of a warehouse to generate economic benefits, its performance must be monitored and controlled. According to Staudt *et al*. (2015), indicators for evaluating warehouse performance include time, cost, quality, and productivity. Meanwhile, Frazelle (2002) categorizes warehouse performance indicators into finance, productivity, utility, quality, and cycle time.

Productivity is defined as an overall measure of the ability to produce goods or services. More specifically, productivity measures how certain resources are managed to achieve goals on time, expressed in terms of quantity and quality. It can also be described as an index that quantifies output (goods and services) relative to input (labor, materials, energy, etc.) used to generate that output (Yadav and Marwah, 2015).

According to Karim *et al*. (2021), measuring productivity in warehousing is considered the most critical dimension for monitoring the output derived from the inputs provided in warehouse operations. Indicators that assess the efficient use of resources must be aligned with the performance of tasks and functions to maximize workload while minimizing operational costs. In this context, the ratio method has been introduced to evaluate warehouse productivity by considering all significant resource inputs (capital and labor) and various service outputs generated by warehouse operations.

This study aims to analyze the factors influencing warehouse productivity in the dairy agro-industry and to identify existing research gaps, as shown in Table I. It is anticipated that this research will contribute to expanding knowledge regarding the factors that influence warehouse productivity, thereby providing guidance for fostering innovation and improvement within the dairy agro-industry and other industrial sectors.

TABLE I
RESEARCH GAP

Research	
Findings from Previous Studies	Regarding the factors influencing warehouse productivity, Rahman and Saifudin (2020) conducted a study by identifying and ranking the most important warehouse productivity factors to improve warehouse operational efficiency. A similar study was carried out by Kusrini (2018), who identified the most critical Key Performance Indicators (KPIs) in warehouse performance measurement.
Research Gap in Previous Studies	According to Rahman and Saifudin (2020), using the Fuzzy Analytical Hierarchy Process (FAHP) method, the most influential factor in warehouse productivity is the Warehouse Management System (WMS). WMS is considered the most critical factor as it enhances stock accuracy, optimizes storage space, increases operational speed, and improves labor and equipment efficiency. Meanwhile, Kusrini (2018), using the Analytical Hierarchy Process (AHP) method, found that the most important KPIs for measuring warehouse performance are productivity, throughput, and warehouse utilization.
Current Study	Previous studies have identified several factors influencing warehouse productivity, including the Warehouse Management System (WMS), productivity levels, throughput, and warehouse utilization. The methods used in previous studies to analyze these factors were the Fuzzy Analytical Hierarchy Process (FAHP) and Analytical Hierarchy Process (AHP). In contrast, the present study will examine a broader range of factors influencing warehouse productivity. These factors include labor, equipment, warehouse layout, technology, throughput, turnover, warehouse utilization, company regulations, warehouse organization, Standard Operating Procedures (SOPs), and education and training. To analyze these factors, this study will employ the MICMAC method.

According to Yadav and Marwah, (2015), productivity is a ratio used to evaluate the performance of an organization (or individual, industry, or country) in converting input resources (labor, materials, machines, etc.) into goods and services. In this context, it is typically expressed as the ratio of input to output, namely the cost (input) per unit of goods or services (output). Productivity is an average measure of production efficiency and is defined as the ratio of output to input used in the production process, specifically output per unit of input. When all outputs and inputs are considered, the measure is referred to as total productivity. In total productivity measurement, both output and input are expressed in terms of their economic value, making it a comprehensive measure of overall production process efficiency. Accordingly, there are two primary strategies to increase productivity: increasing the numerator (output) or reducing the denominator (input). A similar effect can be achieved if both input and output increase, but output grows at a faster rate, or if both decrease, but input decreases more rapidly than output. Organizations have multiple options for applying this formula, including labor productivity, machine productivity, capital productivity, and energy productivity. Productivity ratios may be calculated for a single operation, department, facility, or even an entire country.

O'Donnell (2018) identifies several factors associated with changes in productivity: technical progress (the discovery of new technology), environmental changes (modifications in physical variables involved in production that are not controlled by managers),changes in technical efficiency (variations in the selection and utilization of technology), and changes in scale and mix efficiency (alterations related to economies of scale and substitution).

According to Richard (2014), a warehouse should be viewed as a temporary inventory storage location and as a supporting element within the supply chain. Its primary objective is to facilitate the movement of goods from suppliers to customers and to fulfill orders in a timely manner. A warehouse should operate as a shipping point where all received goods are dispatched as quickly, effectively, and efficiently as possible. Warehouse management activities encompass receiving goods, processing orders, replenishing inventory, performing value-added services, and dispatching products. Progress in warehouse management is generally associated with increased technological integration and automation, improved performance measurement, and more effective resource utilization.

Meanwhile, Kay (2015) defines a warehouse as a supply chain entity where raw materials, work-in-process (WIP), or finished goods are stored for various durations. Warehouses can add value to the supply chain in two primary ways:

Storage, which ensures product availability at the right time and place.

Transport economies, which enable efficient product collection, sorting, and distribution.

Warehouses contribute value only when the benefits of product storage outweigh the additional inventory carrying costs. Other potential advantages of warehousing include: bridging time, by making products available when needed (e.g., storing spare machine parts at a facility); processing, in cases where storage contributes to product transformation (e.g., wine), and safeguarding, such as the storage of nuclear waste. The factors influencing warehouse productivity are shown in Table II.

TABLE II
FACTOR INFLUENCING WAREHOUSE PRODUCTIVITY

Factors	Definitions
Labor	Workers who do work in the finished goods warehouse
Equipment	Equipment used to streamline warehouse operational activities
Layout	Area used for warehouse operational activities
Technology	Scientific methods to achieve practical goals
Throughput	Item per hour leaving the warehouse
Turnover	Ratio COGS and the average inventory
Warehouse Utilization	Average amount of warehouse capacity
Company Regulation	Rules that employees must obey
Warehouse Organization	Warehouse institutions (operator, administration, leader etc.)
Standard Operating Procedures	Standard guidelines for employees to carry out work
Education and Training	A system created to improve employee competency

Source: Richard (2014); Staudt *et al*. (2015); Rahman and Saifudin (2020); Karim *et al*. (2021); Nopriani *et al*. (2022).

Methodology

The method used to analyze the factors influencing warehouse productivity is MICMAC (Cross-Impact Matrix Applied Multiplication). MICMAC stands for *Matrix of Cross-Impact Multiplications Applied to a Classification* and was introduced by Godet *et al*. (1999) as part of *Strategic Foresight*. This method is applied to analyze development scenarios, including those related to sustainable development, through a systematic problem-solving approach.

MICMAC begins with the formulation of the problem, followed by the identification of internal and external variables. It then analyzes the relationships between these variables and assigns weights according to their levels of influence and dependency (Fauzi, 2019). Developed by the *LIPSOR Strategic and Organizational Foresight Research Laboratory*, MICMAC facilitates the identification of strategic variables and the analysis of their influence and dependency on warehouse productivity within the dairy agro-industry. The main advantage of this method is its ability to analyze multiple variables simultaneously, although it does not yield an overall priority score for each variable (Nopriani *et al*., 2022).

The research methodology was designed to assess the influence and dependency of factors affecting warehouse productivity using the MICMAC method, as follows (Godet and Roubelat, 1996; Veltmeyer and Sahin, 2014):

Listing the Elements: The first stage of the MICMAC analysis involves listing the elements that characterize the model under development, as well as the environment in which the model operates.

Describing the Relationships Between Elements: In a systemic approach, an element exists through its interrelationships with other elements. These connections are recorded, compiled, and analyzed using a dual-entry table known as the Dependence/Influence Matrix (MDI). Each cell in the MDI matrix (i, j) represents the influence of variable "i" on variable "j."

Identifying Key Elements: The critical elements necessary for the model's development are first identified through direct classification in the MDI. The matrix is then iteratively multiplied to generate a Matrix of Indirect Influences (MII), which reveals deeper and more complex dependencies.

In the MICMAC method, variables are grouped into four quadrants based on their levels of dependency and influence (Figure 1). Influential variables, also known as "determinant variables," are highly influential with low dependency. These variables are critical elements within the system, as they can act as key factors. Quadrant II includes relay variables, which are both influential and highly dependent. These variables often indicate system instability; any changes in them can have significant consequences for other variables. Quadrant III consists of dependent variables or outcome

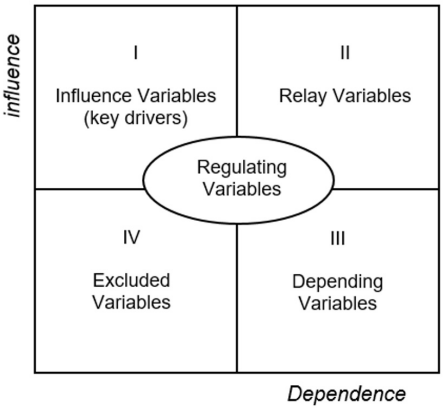

Figure 1. Influence and Dependence Quadrant. Source: Fauzi, 2019.

variables, characterized by high dependency and low influence. These variables are particularly sensitive to changes in both influential and relay variables. Quadrant IV includes excluded variables, also referred to as "autonomous variables". These variables have low influence and low dependency and are considered excluded because they do not significantly impact or sustain the system (Fauzi, 2019).

Results

The results of the MICMAC method analysis are largely determined by the accuracy in identifying the factors that influence warehouse productivity in a dairy agro-industry. The strategic factors or variables identified in the initial stage are subsequently entered into the Matrix of Direct Influence (MDI) to assess the intensity of direct influence and the impact of each variable on the others. The MDI serves as the initial matrix and constitutes the input data for the MICMAC method. It is populated with values ranging from 0 to 3, which represent different levels of influence: 0 - No Influence, 1 - Weak, 2 - Moderate Influence, and 3 - Strong Influence, as illustrated in Table III.

The output of the MDI, when processed using the MICMAC method, determines the positioning of variables on the Influence-Dependency Map, which is segmented into four quadrants: influence variables, relay variables, dependent variables, and excluded variables, as shown in Figure 1. The position of each variable within a given quadrant illustrates the strength of its relationships in terms of influence and dependency among the factors that affect warehouse productivity in the dairy agro-industry. Based on this variable mapping, the influencing factors can be analyzed according to their respective quadrants.

The MICMAC analysis classified the variables into four distinct quadrants, as presented in Figure 2, each with specific characteristics and roles in influencing warehouse productivity. A description of each quadrant is provided as follow: Quadrant I (Influence Variables): This quadrant includes variables that exert the most significant impact on warehouse productivity. Variables in this category function as primary drivers within the system. The variable identified in Quadrant I is company regulation. Its placement in this quadrant indicates that company regulation exerts a strong influence on other system elements. Therefore, it plays a dominant role in determining the efficiency and effectiveness of warehouse operations overall. Quadrant II (Relay Variables): variables in this quadrant are characterized by high influence and high dependency, making them sensitive and unstable within the system. This implies that any changes or interventions affecting these variables can have widespread implications (Nopriani *et al*., 2022). These variables act as intermediaries, linking various components of the system. Examples include labor, warehouse organization, equipment, layout, technology, and standard operating procedures (SOPs). Due to their volatility, any modifications involving these variables should be implemented with caution to avoid system disruptions. Quadrant III (Dependent Variables): are highly dependent and sensitive to changes originating from Quadrants I and II. These variables do not directly influence the system but are instead shaped by more dominant variables. Accordingly, changes in Quadrants I and II will directly impact those in Quadrant III (Hindayani *et al*., 2021). Examples of such variables include throughput, turnover, and warehouse utilization, all of which reflect how warehouse performance depends on upstream influences. Finally,

TABLE III
IDENTIFY VALUES MATRIX DIRECT INFLUENCE (MDI)

	1 : Labour	2 : Equipment	3 : Layout	4 : Tech	5 : Thrp	6 : Turn	7 : Wh_Utz	8 : Com_Reg	9 : WH_Org	10 : Pros_Opr	11 : Edu_Tra
1 : Labour	0	2	2	2	2	2	2	2	2	3	1
2 : Equipment	2	0	2	2	2	2	2	2	2	2	1
3 : Layout	2	2	0	2	2	2	2	2	2	2	1
4 : Tech	2	2	2	0	2	2	2	2	2	2	1
5 : Thrp	2	2	2	2	0	1	1	1	1	1	1
6 : Turn	2	2	2	2	1	0	1	1	1	1	1
7 : Wh_Utz	2	2	2	2	1	1	0	1	1	1	1
8 : Com_Reg	3	2	2	2	2	2	2	0	3	2	3
9 : WH_Org	2	2	2	2	2	2	2	2	0	2	2
10 : Pros_Opr	2	2	2	2	2	2	2	2	2	0	1
11 : Edu_Tra	1	1	1	1	1	1	1	1	1	1	0

Tech: technology, Thrp: throughput, Turn: turn over, Wh_Utz: warehouse utilization, Com_Reg: company regulation, WH_Org: warehouse department, Pros_Opr: standard operating procedure, Edu_Tra: education and training.

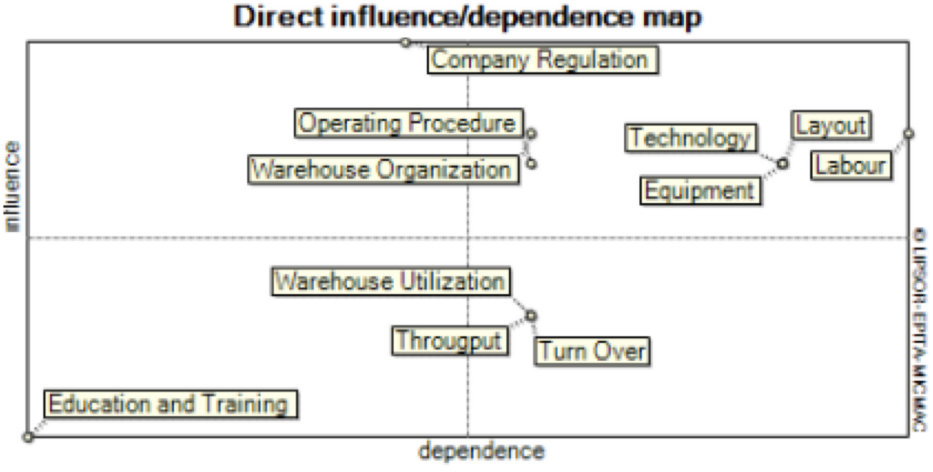

Figure 2. Influence and dependency quadrant of factors influencing warehouse productivity.

Quadrant IV (Excluded Variables): this quadrant contains variables with minimal influence and low dependency. Their presence does not significantly affect overall warehouse operations. Furthermore, they do not contribute meaningfully to system sustainability or performance. As such, variables in this quadrant are considered non-essential in directly or indirectly influencing warehouse productivity (Fauzi, 2019). The variable identified in this quadrant is education and training.

There is a direct relationship between variables in influencing warehouse productivity (Figure 3). To see the strength of the direct influence between variables, you can look at the color and thickness of the lines that connect one variable to another.

The company regulation variable has a very strong direct influence on warehouse productivity in the dairy agro-industry. The company regulation variable has a very strong direct influence on warehouse organization, labor and education and training. Meanwhile, the labor variable has a very strong influence on standard operating procedures. Thus, from the research results it can be shown that the company regulation variable and the labor variable have a very strong influence on warehouse organization, standard operating procedures and education and training.

Discussion

The accuracy in identifying variables expected to influence warehouse productivity in the dairy agro-industry determines the validity and reliability of the MICMAC (Cross-Impact Matrix Applied Multiplication) analysis. The strategic variables identified in the initial phase are subsequently entered into the Matrix of Direct Influence (MDI) to evaluate the intensity and impact of each variable on others. The outcomes from the MDI serve to determine the positioning of variables on the Influence-Dependency Map, which is segmented into four quadrants based on influence and dependency classifications: influence variables, relay variables, dependent variables, and excluded variables.

The MICMAC analysis reveals the distribution of variables across these quadrants.

In Quadrant I (Influence Variables), company regulation emerges as a dominant factor with substantial influence yet minimal dependency on other variables. This variable has a significant direct impact on other variables affecting warehouse productivity in the dairy agro-industry. In this context, company regulation serves as a primary reference framework that must be followed by all employees. These regulations encompass various employment aspects, including rules regarding labor relations, wage structures, working days, employee benefits, and termination policies. When such regulations are clearly defined and consistently enforced, operational efficiency and compliance in the warehouse environment can be effectively maintained. In Quadrant II (Relay Variables), six key variables are identified as highly sensitive and unstable within the system. These include: Labor, Warehouse organization, Equipment, Layout, Technology and Standard Operating Procedures (SOPs).

A primary characteristic of these variables is their high susceptibility to interventions from other variables. That is, modifications to any of these variables may trigger cascading changes throughout the warehouse system (Nopriani *et al*., 2022). As shown in Figure 1, the variables warehouse organization and standard operating procedures (SOPs) are positioned above the diagonal line, indicating that they exert significant influence over other variables (Godet *et al*., 1999). These two factors are critical to system stability, as many other variables depend heavily on them. In terms of warehouse organization, effective interpersonal dynamics among employees play a central role in enhancing productivity. Establishing positive relationships between supervisors and subordinates, empowering employees through delegated authority, and recognizing high-performing workers are actions that help sustain and boost productivity in dairy warehouse operations.

Meanwhile, Standard Operating Procedures (SOPs) function as operational guidelines that ensure all warehouse activities are executed in accordance with established processes. SOPs provide employees with clear instructions for task execution, while offering management a framework for enforcing discipline. In the event of noncompliance, supervisors are authorized to issue Warning Letters (SP) as disciplinary measures to ensure adherence to operational standards. In Quadrant III (Dependent Variables), three key variables are identified as being highly dependent on the variables from Quadrants I and II. These include: Throughput, Turnover, Warehouse utilization. These variables exert minimal direct influence on the system but are significantly affected by changes in the more dominant variables (Hindayani *et al*., 2021). For instance, changes in company regulation, such as modifications to wage policies or overtime rules.

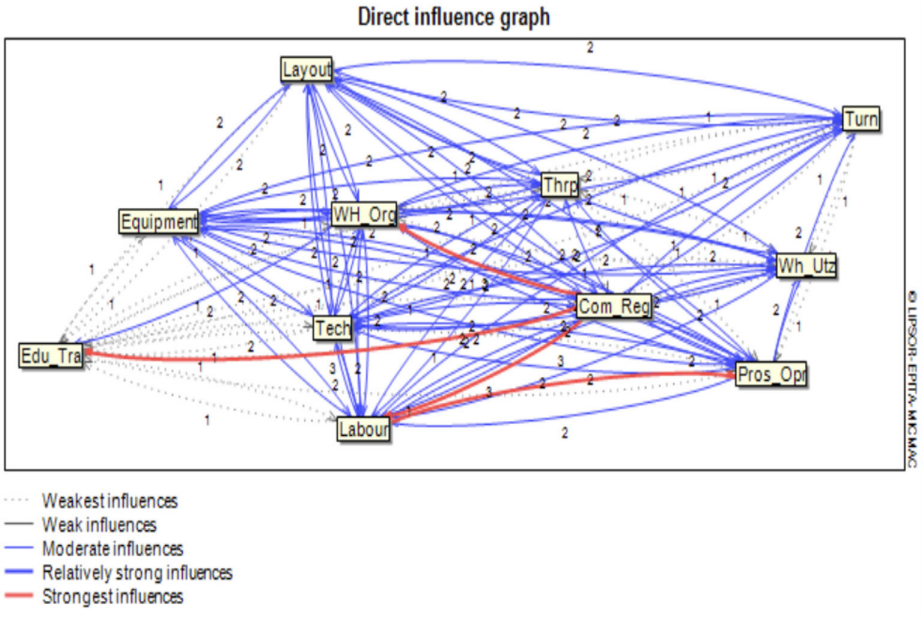

Figure 3. Direct influence relationship between variables.

Conclusion

The analysis was conducted by identifying key variables using the MICMAC method and examining their influence and dependency relationships. The findings from the analysis of factors affecting warehouse productivity in the dairy agro-industry using the MICMAC method are categorized as follows:

1. Influential Variables / Key Drivers: company regulation.

2. Relay Variables (factors that influence or are influenced by others when interventions occur): warehouse organization, standard operating procedures, labor, equipment, layout, and technology.

3. Dependent Variables (factors that rely on other variables): throughput, turnover, and warehouse utilization.

4. Excluded Variables (factors with neither significant influence nor dependency): education and training.

The results of the MICMAC analysis indicate that variables in the determinant and relay quadrants exert strong influence on other variables and serve as a foundation for companies to formulate improvement strategies aimed at enhancing warehouse productivity in the dairy agro-industry.

The current analysis is limited to identifying influencing factors. Therefore, further analytical research is required to explore warehouse productivity improvement from the perspective of stakeholders involved in the process.

Theoretical implications

The findings support the theoretical framework suggesting that company regulation is the most influential factor in warehouse productivity. In addition, variables such as warehouse organization, standard operating procedures, labor, equipment, layout, and technology are classified as relay variables due to their sensitivity and instability within the system, making them highly susceptible to external changes.

Meanwhile, throughput, turnover, and warehouse utilization are considered dependent variables, as their performance is significantly affected by changes in dominant variables.

Conversely, education and training fall under excluded variables, as their impact on warehouse productivity is relatively minimal and they do not exhibit strong dependency on other system components.

The MICMAC (Matrix of Crossed Impact Multiplications Applied to a Classification) method is validated as an effective analytical tool for identifying and classifying the variables influencing warehouse productivity. This method enables in-depth analysis of the interactions among dominant variables, relay variables sensitive to change, dependent variables, and excluded variables. Through this analysis, management can better understand interdependency patterns and design more effective strategies to enhance overall warehouse productivity and efficiency.

Practical implications

Optimization of policies and regulations

Recognizing that company regulation is a dominant influence (Quadrant I), management can ensure that implemented policies effectively support warehouse productivity. Clear rules regarding working hours, wage systems, and labor relations promote employee compliance and reduce conflict that could disrupt operations.

Enhancement of warehouse operational efficiency

Relay variables (Quadrant II) such as warehouse organization, technology, layout, and SOPs have substantial impact. Strategic interventions in these areas can significantly improve warehouse performance. For example, optimizing warehouse layout can accelerate goods flow, reduce search time, and improve labor efficiency. The implementation of automation technologies, such as barcode scanning and Warehouse Management Systems (WMS), can improve the accuracy and speed of operations.

Improved workforce management

Given that labor is a sensitive variable (Quadrant II), improvements in workforce management—such as skills development, incentive programs, and workload balancing—can lead to increased productivity. Establishing healthy workplace relationships and a positive organizational culture further supports employee motivation and productivity.

Direct impact on warehouse performance

Dependent variables (Quadrant III), including throughput, turnover, and warehouse utilization, are highly affected by changes in regulations and warehouse operations.

By effectively managing factors from Quadrants I and II, companies can improve throughput (goods flow), turnover (inventory cycling), and warehouse space utilization. For instance, refining SOPs to accelerate loading/unloading can increase throughput, ultimately resulting in higher customer satisfaction.

Strategic training and development programs

Although education and training are classified as excluded variables (Quadrant IV), they remain important for long-term improvement. While their short-term impact may be limited, training programs help employees adapt to new technologies and operational procedures. Therefore, training initiatives should be strategically allocated, prioritizing skill areas with the greatest potential to enhance productivity.

By understanding the factors influencing warehouse productivity, management can make data-driven decisions to improve operational efficiency, optimize regulatory frameworks, better manage human resources, and increase warehouse performance indicators such as throughput and utilization. Additionally, organizations can develop more targeted employee training and development strategies to ensure the long-term sustainability of warehouse operations.

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PRODUCTIVIDAD EN LOS ALMACENES DE LA AGROINDUSTRIA LÁCTEA: FACTORES CLAVE DETERMINANTES

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RESUMEN

En el competitivo mercado global actual, las empresas deben encontrar nuevas formas de agregar valor a sus clientes. En consecuencia, con la dinámica siempre cambiante del mercado global, las empresas deben competir con firmas rivales en términos de productos, costos, calidad y servicios. Esto, a su vez, ha impulsado el desarrollo de sistemas logísticos más sofisticados que los tradicionales. El establecimiento de un almacén debe tener beneficios económicos. Los beneficios económicos se pueden lograr aumentando la productividad del almacén mediante una mayor eficiencia en las operaciones del almacén. Esencialmente, el almacén debe verse como un lugar temporal para almacenar productos para satisfacer la demanda del cliente de manera oportuna y rentable. Con el aumento de los costos operativos, han surgido conceptos como Just-In-Time *(JIT por sus siglas en inglés) y modelos de sistemas de arrastre, entre otros. Estos conceptos tienen como objetivo minimizar la cantidad de inventario almacenado y acelerar el proceso de producción para que se puedan controlar los costos operativos. El objetivo de este estudio es analizar los factores que influyen en la productividad del almacén en una agroindustria láctea en Indonesia. El método analítico utilizado en esta investigación es el método MICMAC (Matrice d'impacts croisés-multiplication appliquée), desarrollado por el Laboratorio de Investigación Estratégica y Organizacional LIPSOR Prospective (Foresight). Esta investigación tiene como objetivo mejorar el conocimiento sobre los factores que influyen en la productividad del almacén. Por lo tanto, puede servir de guía para la innovación y mejora no solo en la agroindustria láctea, sino también en industrias similares en otras regiones.*

PRODUTIVIDADE NOS ARMAZÉNS DA AGROINDÚSTRIA DE LATICÍNIOS: FATORES DETERMINANTES

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RESUMO

No competitivo mercado global atual, as empresas devem encontrar novas formas de agregar valor a seus clientes. Consequentemente, com a dinâmica sempre mutável do mercado global, as empresas devem competir com firmas rivais em termos de produtos, custos, qualidade e serviços. Isso, por sua vez, impulsionou o desenvolvimento de sistemas logísticos mais sofisticados do que os tradicionais. O estabelecimento de um armazém deve ter benefícios econômicos. Os benefícios econômicos podem ser alcançados aumentando a produtividade do armazém por meio de uma maior eficiência nas operações do armazém. Essencialmente, o armazém deve ser visto como um local temporário para armazenar produtos para atender à demanda do cliente de maneira oportuna e econômica. Com o aumento dos custos operacionais, surgiram conceitos como Just-In-Time (JIT) e modelos de sistemas pull, entre outros. Esses conceitos têm como objetivo minimizar a quantidade de inventário armazenado e acelerar o processo de produção para que os custos operacionais possam ser controlados. O objetivo deste estudo é analisar os fatores que influenciam a produtividade do armazém em uma agroindústria láctea na Indonésia. O método analítico utilizado nesta pesquisa é o método MICMAC (Matrice d'impacts croisés-multiplication appliquée), desenvolvido pelo Laboratório de Pesquisa Estratégica e Organizacional LIPSOR Prospective (Foresight). Esta pesquisa tem como objetivo aprimorar o conhecimento sobre os fatores que influenciam a produtividade do armazém. Portanto, pode servir como orientação para inovação e melhoria não apenas na agroindústria láctea, mas também em indústrias similares em outras regiões.