Actors Influencing Warehouse Productivity in the Dairy Agro-Industry in Indonesia

Tri Hardi
Agribusiness Doctoral Study Program, University of Pembangunan Nasional Veteran Jawa Timur, Jl Raya Rungkut Madya, Surabaya 60294, East Java, Indonesia
trihardi7@gmail.com

Syarif Imam Hidayat
Agribusiness Doctoral Study Program, University of Pembangunan Nasional Veteran Jawa Timur, Jl Raya Rungkut Madya, Surabaya 60294, East Java, Indonesia
syarifimamhidayat@yahoo.com

Hamidah Hendrarini
Agribusiness Doctoral Study Program, University of Pembangunan Nasional Veteran Jawa Timur, Jl Raya Rungkut Madya, Surabaya 60294, East Java, Indonesia
hamidah_h@upnjatim.ac.id

Taufik Setyadi
Agribusiness Doctoral Study Program, University of Pembangunan Nasional Veteran Jawa Timur, Jl Raya Rungkut Madya, Surabaya 60294, East Java, Indonesia
taufiksetyadi.agri@upnjatim.ac.id

Abstract
In supply chain management, warehouses play a crucial role. Amid the phenomenon of erratic demand for goods, the warehouse acts as a buffer to anticipate fluctuations and increases in demand. Given this critical role, monitoring warehouse operational performance is essential to ensure efficient and continuous operations. According to Kolinski and Sliwczynski (2015), measuring warehouse operational performance can be done by measuring warehouse productivity. This article examines the factors influencing warehouse productivity, focusing on the perspectives of stakeholders or actors involved in warehouse operations within the dairy agro-industry in Indonesia. The analysis method used in this research is the MACTOR (Matrix of Alliances and Conflicts: Tactics, Objectives, and Recommendations) analysis method developed by the LIPSOR Prospective (foresight) Strategic and Organizational Research Laboratory. Through this research, it is hoped that it can contribute to increasing knowledge about stakeholders or actors who play a role in influencing warehouse productivity.

Keywords: *dairy agro-industry, warehouse productivity, MACTOR Method*

Introduction

In the competitive landscape of modern global business, a company's success depends on its ability to effectively integrate supply chain management. Today, competition is no longer between companies but between supply chain systems. A company implementing excellent supply chain management is more likely to emerge as a winner (DeSmet, 2018).

To enhance the competitiveness of supply chain management, warehouses a key component of the supply chain must optimize their performance. Efficient warehouse operations improve quality, delivery time, customer satisfaction, and cost efficiency in the logistics system. Warehouses serve as specialized spaces for storing materials. In the supply chain flow, the warehouse will provide materials for production and as a place to store production results (Kusrini et al., 2018). According to Kolinski et al. (2015), the relationship between warehouse management and other supply chain components can be categorized as follows:

- Procurement - the purpose of warehouse management is to receive materials and raw materials for supplier production, storage and dispensing for production.
- Production - where warehouse management tasks are reduced to the optimal allocation of materials and resources to the appropriate areas and stages of production.
- Distribution - where finished goods are stored, finished and delivered in such a way as to fulfil customer expectations (the right product, at the right time, the right place and at the right price).

To create a competitive warehouse, monitoring operational performance is crucial. Warehouse performance evaluation indicators can be in the form of time, cost, time dimension, quality and productivity (Staudt et al., 2015). According to Frazelle (2002), warehouse performance evaluation indicators are finance, productivity, utility, quality and cycle time.

Yadav et al. (2015) stated that productivity is the ability to produce goods or services. More specifically, productivity is a measure of how certain resources are managed to achieve goals in a timely manner expressed in terms of quantity and quality. Productivity can be defined as an index measuring outputs (goods and services) relative to inputs (labor, materials, energy, etc.). According to Karim et al. (2021) to measure warehouse productivity from warehouse performance, namely by using all important warehouse resource inputs (capital and labour) and various service outputs (resulting from warehouse operations).

Warehouse operational performance must be maintained and improved. One way to achieve this is by increasing warehouse productivity. This article examines the factors influencing warehouse productivity, focusing on the perspectives of stakeholders or actors involved in warehouse operations within the dairy agro-industry in Indonesia.

Research Method

The MACTOR method, developed by Michel Godet in 1999 and updated from the 1979 model, stands for Method Acteurs, Objective, Rapports de Force, which is then better known in English as the Matrix of Alliance, Conflicts, Tactics Objective and Recommendations. The MACTOR method is based on *inter-actor* influence. In other words, MACTOR analyses the *relative strength of* stakeholders or actors and explores the similarities and differences in the problems and objectives to be achieved.

In the MACTOR method, actors are defined as entities that have a position in the system being studied and play a role in mobilising their resources to influence outcomes directly or indirectly through their influence on other actors. Factors or issues are defined as variables, topics, or triggers. The MACTOR method is used to identify the functions and roles of warehouse supply chain actors. The MACTOR analysis framework involves defining strategic actors, identifying issues and objectives, mapping actors' positions concerning objectives, prioritizing objectives, conducting balance of power analyses, integrating results into convergence and divergence analyses, and formulating key questions to reconstruct system elements (Nashr, 2021).

One of the advantages of the MACTOR method is that it can be used for a wide variety of strategies involving multiple actors using a set of stakes and objectives. In this respect, the method differs from research derived from game theory in that

which often results in the construction of workable but unworkable models. Nevertheless, significant progress can be made through a closer relationship between the concepts of game theory and the methods of Macher.

According to Godet (2004) a matrix of direct influence between actors is created using a strategic table by analysing the way each actor acts. The balance of power analysis is calculated using the MACTOR software (this software was developed by the LIPSOR Prospective (foresight) Strategic and Organisational Research Laboratory) by taking into account direct and indirect influences, for example, an actor can have another influence through a third person. An influence dependency plan of the actors is then created. The balance of power analysis between actors represents the strengths and weaknesses of each actor, the possibilities of blocking them, etc. The relationship between influences and dependents in each actor is then analysed. Influence and dependent relationships for each variable are presented in **Figure 1**

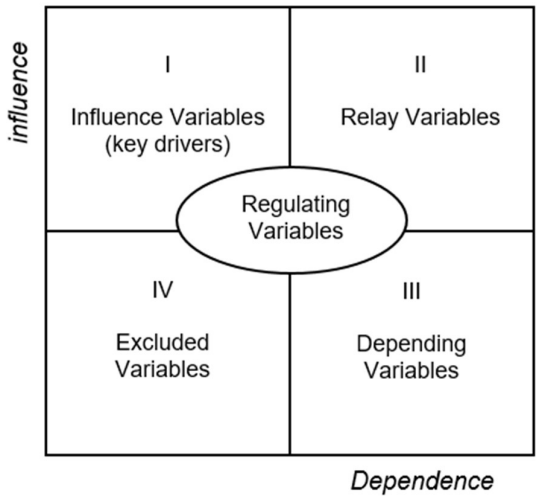

Figure 1. Influence and dependence relationships on each variable

The MACTOR method has a number of limitations in terms of gathering the necessary information. The reluctance of actors can be observed when they are asked to reveal their strategic projects and external ways of acting. There is an element of confidentiality that cannot be overcome (one can still double-check the data). Furthermore, representing a game actor based on this method presupposes consistent behaviour on the part of each actor in relation to outcomes, which is often contradictory in reality. In terms of tools, the current MACTOR software requires only two data tables from which several pages of result lists and diagrams can be obtained. However, this is the main danger that awaits MACTOR users tempted, even carried away by being carried away by the wave of results and comments generated, they forget that everything depends on the quality of the input data as well as the ability to select the most relevant results.(Godet,2004)

The stakeholders or actors involved in warehouse operations in a dairy agro-industry in Indonesia are as follows:

Table 1. Warehousing Productivity Actors

Actors	Definitions
Company Management	Company management responsible for aspects including strategic planning, decision-making, human resource management, operations management, financial management and control.
Warehouse Leader	Head of Warehouse Operations is responsible for managing all operational activities in the warehouse effectively and efficiently.

Warehouse Operator	Workers who are responsible for various operational activities in the warehouse. The main task of a warehouse operator is to ensure that goods are received, stored, and shipped in a timely manner and in good condition.
Material Handling Equipment Operator	Workers responsible for operating material handling equipment MHE (Material Handling Equipment). In the activities of receiving, storing and shipping goods. MHE is mechanical equipment used to move, store, control and protect materials, goods and products. MHE can be vehicles, equipment, storage units and accessories.
Distributor	A company or business entity that acts as an intermediary between producers and end consumers. Distributors buy products in bulk from manufacturers, then distribute them to consumers or retailers. Distributors have an important role in the supply chain, namely: organising the flow of goods from producers to various points of sale, ensuring the availability of goods in the market, meeting consumer demand and ensuring production continuity.
Vendor Transporter	A company that provides logistics and supply chain services to an organisation. They are responsible for the management, organisation, and supervision of logistics activities, including the delivery of goods and services to customers. A transporter is an individual or company responsible for delivering goods from one place to another. Transporters can act as logistics vendors for business or manufacturing companies.

Warehouse Administration	Workers whose activities involve organising, recording, and compiling data, as well as systematically carrying out the tasks and functions of an organisation or company.

Result and Discussion

To identify the actors influencing warehouse productivity, this study employs the MACTOR (Matrix of Alliance, Conflicts, Tactics, Objectives, and Recommendations) analysis method, developed by the LIPSOR Prospective Strategic and Organizational Research Laboratory.

The MACTOR analysis identifies relationships between actors impacting warehouse productivity by inputting data into the MDI matrix (Matrix of Direct Influences), using values from 0 to 4 (representing low to high influence). These values are defined as follows: 0 (no influence), 1 (operating procedure), 2 (projects), 3 (missions), and 4 (existence). The influence between actors, both direct and indirect, is assessed through the MDII matrix (Matrix of Direct and Indirect Influences). The MDII matrix values indicate the significance of both direct and indirect influences among the actors involved. The higher the MDII value, the higher the influence of certain actors on other actors. The results of filling in the MDI matrix can be seen in **Table 2**

Table 2. MDI (*Matrix of Direct Influences*)

MDI	Com Mng	WH Lead	WH Opr	MHE Opr	Dist	Vend Tnsp	WH Adm
Com Mng	0	4	4	4	4	4	4
WH Lead	4	0	3	3	3	3	3
WH Opr	3	4	0	4	2	2	3
MHE Opr	3	4	4	0	2	2	4
Dist	3	3	3	3	0	3	3
Vend Tnsp	3	3	3	3	3	0	3
WH Adm	1	2	2	4	2	2	0

Description:

Com Mng	: Company Management
WH Lead	: Warehouse Leader
WH Opr	: Warehouse Operator
MHE Opr	: MHE Operator
Dist	: Distributor
Vend Tnsp	: Vendor Transporter
WH Adm	: Warehouse Administration

Table 3. MDII (*Matrix of Direct and Indirect Influences*)

MDII	Com Mng	WH Lead	WH Opr	MHE Opr	Dist	Vend Tnsp	WH Adm	Ii
Com Mng	17	20	19	21	16	16	20	112
WH Lead	17	18	18	19	16	16	19	105
WH Opr	15	17	16	17	14	14	17	94
MHE Opr	15	17	16	18	14	14	17	93
Dist	16	17	17	18	15	15	18	101
Vend Tnsp	16	17	17	18	15	15	18	101
WH Adm	12	13	13	13	11	11	13	73
Di	91	101	100	106	86	86	109	679

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In **Table 3.** can be seen the calculation of MDII based on the results of the matrix structure analysis. The MDII table reveals that company management holds the highest influence (direct and indirect) among actors, with an Ii value of 112. This is because company management is the determinant of the direction of the company's strategic policy and is the decision maker for each policy that has been determined. Administration, with an Ii value of 73, is the actor with the lowest influence on others. This is also in accordance with the role of administration only as a party that only assists warehouse operations in terms of administration.

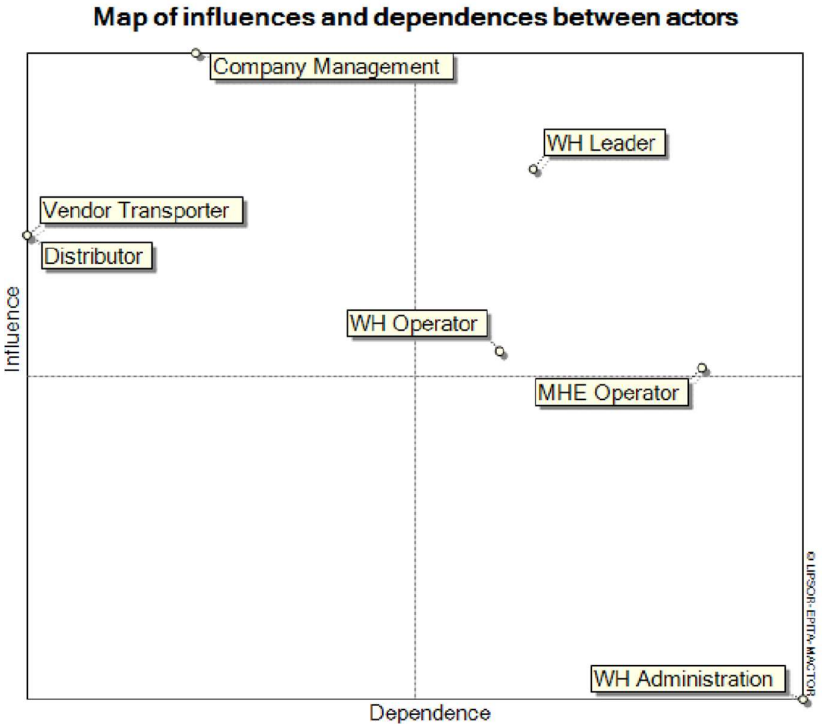

Figure 2. Influence and Dependence Relationship Quadrant Between Actors

The MACTOR method results for each quadrant in **Figure 2** are explained as follows: Quadrant I (influence variables) contains stakeholders or actors that are most influential in affecting the productivity of dairy agro-industry warehouses in Indonesia. The variables included in Quadrant I are company management, distributors and transporter vendors. By entering Quadrant I, company management, distributors and transporter vendors have the power to influence other stakeholders or actors and affect warehouse productivity. In Quadrant II (relay variables), there are sensitive variables that are very unstable in the system. If there is intervention in these variables, it will affect the system as a whole (Nopriani et al, 2022). Stakeholders or actors included in Quadrant II are Warehouse leaders, warehouse operators and MHE (material handling equipment) operators. In Quadrant III (dependent variables), the variables included in it are variables that are sensitive and dependent on changes in variables in Quadrants I and II. These variables are influenced by the variables in Quadrants I and II (Hindayani, 2021). The stakeholder or actor in this quadrant is the warehouse administration. In Quadrant IV (excluded variables), the existing variables are characterised by having little influence and little dependence. These variables are said to be excluded because they will not stop the operation of a system or take advantage of the system itself (Fauzi, 2019). There are no variables included in this quadrant.

All variables in Quadrant I are key determinants and crucial elements in the system, serving as stakeholders or actors influencing warehouse productivity (Fauzi, 2019). The variables included in Quadrant I are company management, distributors and transporter vendors. Company management as a stakehoder or actor who is key in influencing warehouse productivity this is because company management is the determinant of the direction of the company's strategic policies and is the decision maker for each policy that has been determined. The next variable in Quadrant I is the distributor. distributor as a stakehoder or actor who is key in influencing warehouse productivity this is because the distributor is the bridge between producers and consumers. So it is expected that demand from distributors does not fluctuate. With the increase and decrease in demand will affect warehouse productivity. With high demand there will be over time and with decreasing demand there will be excess labour and this results in inefficient warehouse operations. The last variable in quadrant I is the transporter vendor. Transporter vendors are key in influencing warehouse productivity. This is because transporter vendors are transport service providers. Transporter vendors will carry goods from producers and consumers. Warehouse operations will be problematic if the supply of transport from the transporter vendor is not smooth. With these conditions, warehouse operations will run inefficiently.

Quadrant II contains variables that are influential but highly dependent. The variables in this quadrant are sensitive and very unstable in the system. If there is intervention in these variables, it will affect the system as a whole (Nopriani et al. (2022).Stakeholders or actors included in quadrant II are Warehouse leaders, warehouse operators and MHE (material handling equipment) operators. The first variable is warehouse keader, in this discussion it consists of warehouse managers

and warehouse supervisors. As the leader in the warehouse department, the warehouse leader is responsible for warehouse operations. So that it can influence all employees in the warehouse department. But the power to influence depends on the policies of the company management. The second variable is the warehouse operator. Warehouse operators are responsible for operational activities in the warehouse. The main task of warehouse operators is to ensure that goods are received, stored, and shipped in a timely manner and in good condition. With responsibility in this field, warehouse operators can interact and influence other stakeholders or actors. But warehouse operators still have dependencies with other variables. In the case of an example, warehouse operators depend on company management policies. The last variable in quadrant II is the MHE operator. MHE operators are responsible for operating MHE (Material Handling Equipment) material handling equipment. In the activities of receiving, storing and shipping goods. With responsibility for the operation of MHE (material handling equipment), of course, MHE operators can interact and influence other stakeholders or actors. It can be exemplified that MHE operators depend on company management policies. Variables in Quadrant III are characterised by high dependency. These variables depend on changes in variables in Quadrants I and II. These variables are influenced by variables in Quadrants I and II (Hindayani, 2022). The stakeholder or actor in this quadrant is warehouse administration. Warehouse administration is responsible for organising, recording and compiling data. The administrative warehouse is highly dependent on other stakeholders or actors. In Quadrant IV the variables are characterised by having little influence and little dependence. These variables are said to be excluded because they will not stop the operation of a system or take advantage of the system itself (Fauzi, 2019). There are no variables included in this quadrant.

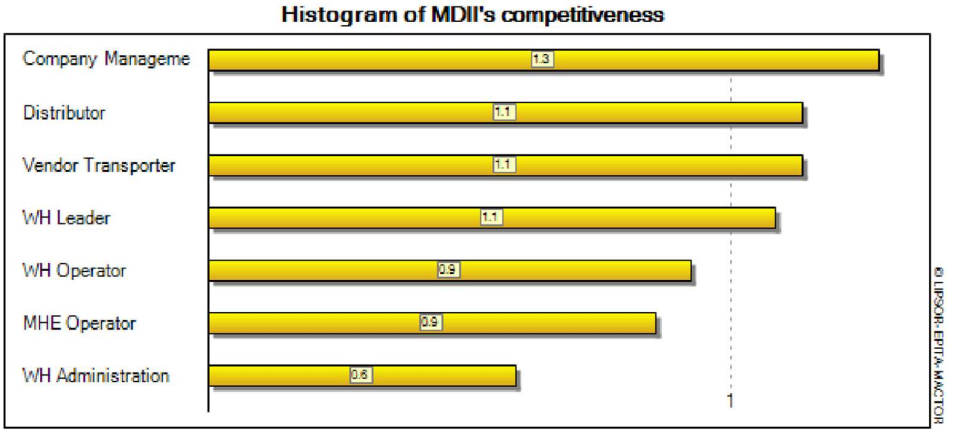

Figure 3. Histogram *of* MMDI *Matrix of Direct and Indirect Influences*

In **Figure 3**. it can be seen that MMDII (*Matrix of Direct and Indirect Influences*) is used to determine the maximum level of influence that an actor can have on other actors, either directly or indirectly (through intermediary actors). In the figure above, company management has the highest value, thus company management has the maximum influence to influence other stakeholders or actors

Conclusion

This study analyzed key variables using the MACTOR method, focusing on influence and dependence relationships between variables. The analysis results regarding stakeholders or actors influencing warehouse productivity in Indonesia's dairy agro-industry are as follows:

1. Influential variables/key drivers: company management, distributors and transporter vendors.
2. Bridging Variables (actor will affect or depend on other actors if there is intervention from other actors): Warehouse leader, warehouse operator and MHE operator.
3. Dependent variables (actors that depend on other actors): Warehouse administration

The MACTOR method analysis shows that key variables in the determinant and relationship quadrants strongly influence other variables, providing a benchmark for companies to develop strategies to enhance warehouse productivity in Indonesia's dairy agro-industry.

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