

Literature Review of Application of Agricultural Distribution Systems: State of the Art and Recent Developments

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Abstract—Agriculture has an important role in the development program, especially to increase people's welfare, the food crop sector is an aspect that receives attention especially for maintaining food availability, food distribution / reach, food quality and safety. Food distribution is carried out with a distribution system that refers to the types, strategies, policies, models and methods used. Each has a role in achieving a distribution system that is up to date following the latest developments / state of the art. The purpose of this study is to understand the literature review of the distribution system implementation seen from aspects of type, strategy and policy, models and methods. In this paper we map the distribution system of several variables systematically starting from identifying and classifying types / types of distribution channels, distribution system strategies and policies, and distribution system models. The literature on agricultural distribution systems is very broad and complex so it needs to be identified the extent of the development of its application, so that the distribution system runs according to theory, implementation and the latest developments. This can be expressed in a number of cases in this distribution system research. The results of this study produce a percentage value for each classification of the distribution system so as to provide a detailed picture of the scope of the literature review so that it can be considered for further research.

Keywords: *food distribution, food availability, distribution types, distribution strategies and policies, distribution models, distribution methods*

I. INTRODUCTION

The agricultural sector is one sector that has an important role in supporting the Indonesian economy. The agricultural sector in Indonesia needs to be developed in line with population growth and technological developments in order to increase agricultural production. Agriculture plays an important role in development and as a measure of the welfare level of a country's population, especially in meeting the needs, supplies, and food consumption of its population. One of the commodities that is very important and in line with the government's program in food self-sufficiency is food crops. Food crops are one of the

commodities and are currently being developed and are of concern to the government. Aspects that must be met to achieve food security conditions are the adequacy and stability of food availability, affordability / distribution of food and food quality / safety. According to Isbandi and Rusdiana (2014), food availability in all regions is carried out by distributing food through efforts to develop an efficient food distribution system, able to maintain food safety, quality and nutrition as well as ensure food distribution security. The problem of food availability in all consumer regions is very closely related to distribution problems

Distribution is the process flow from one process to the next. Supply Chain Management includes management information systems, purchasing, customer service, resources, transportation, production schedules, demand fulfillment processes, inventory management, warehousing and marketing (Nabhani, *et al*, 2009). Logistics service activities are divided into three parts namely: management of raw materials (material management), exchange / conversion management (conversion management), and physical distribution (Iriani, *et al*, 2010). Furthermore, physical distribution service includes several activities such as transportation, facility structure management, inventory management, and handling of raw materials for packaging or loading (material packaging and handling) (Iriani, *et al*, 2010)

Logistic distribution is dynamic and involves a constant flow of information, products, and finance between different levels. In fact, the main goal of various logistics is to meet customer needs and in the process, generate profits for companies. Competitive advantage of logistics distribution is how the ability to manage the flow of goods or products in a supply chain, in other words the logistic distribution network model is an important activity that must be done on supply chain management. Implementation of supply chain strategies only takes place effectively if the supply chain has a network with the appropriate configuration (Pujawan.I.N., 2010) because network configuration can determine

whether a logistics distribution will be responsive or efficient. Basically the network in logistics distribution is the result of several strategic actions. First, the actions regarding the strategic location of distribution centers, warehouse facilities, workforce reliability, smooth transportation and product availability.

The purpose of this paper is to identify the development of agricultural distribution systems and the methods or approaches used in their application. In this paper we map the distribution system of several variables systematically starting from identifying and classifying types / types of distribution channels, distribution system strategies and policies, and distribution system models. The literature on agricultural logistics distribution systems is very broad and complex so it needs to be identified the extent of the development of its application, whether the distribution system has gone according to a developing theory. Certainly this study is needed and valuable for the research community. We hope this mapping provides preliminary information on the development of agricultural logistics distribution systems which ultimately lead to the aim of improving agricultural distribution systems, especially food crops.

A. Distribution System Theory

1) Type of system / distribution channel

According to Suryanto, M, H (2016), distribution channels can be grouped into 2 types, namely 1) Old Paradigm distribution channels 2) New paradigm distribution channels. Understanding and deepening as follows:

According to Vernon and Jackson (1994) the types of distribution channels based on their intensity are divided into three, namely:

- Intensive form, which is a type of channel that utilizes many large and small traders.
- Selective form, which is a type of distribution that only utilizes a few wholesalers and a small number of retailers.
- Exclusive form, which is a distribution channel that only involves one intermediary in a particular community environment to handle the product. The channels that we are currently meeting can be divided into two, namely direct channels and non-direct channels. Direct channel from producer to consumer. Usually only a few items are marketed directly.

Indirect channel, which is divided into two, namely from producers to retailers to consumers and from producers to wholesalers to retailers to consumers. Below are described several types of channels for consumer goods and industrial goods, namely:

- Types of distribution channels for consumer goods
- Types of distribution channels for industrial goods

2) Distribution System / Channel Strategy and policies

Distribution channel policies and strategies are carried out by: 1) Direct Shipment 2) Delivery through warehouse 3) Cross Docking 4) Online delivery (Pujawan I.N, Mahendrawati, 2017)

Distribution system / channel policy regarding the determination and management of distribution channel structure which includes:

- Postponement Speculation Theory. This theory was developed by Bucklin who based the distribution channel selection on the risks, uncertainties and costs that might arise in transactions.
- Good Approach. Aspinwall stated that describing product characteristics is the main determinant of the right and economical distribution method. These characteristics include Replacement rate, Gross Margin, Adjustment, Time of consumption and searching time
- Financial Approach. This approach shows that the choice of marketers in their distribution channels is based on financial resources and the need for controlling product distribution.

Evaluate distribution channels using a number of criteria, namely distribution costs, market coverage / market penetration, customer service, and communication with the market.

Priority System Strategy / distribution channel using the Hierarchy Analysis Process / AHP which has high flexibility, the ability to accommodate the complexity of existing problems into a hierarchy and the obstacles to accommodate opinions among experts.

Alternative systems / distribution channel strategies viz

- Improve the quality, quantity and continuity of production
- Expanding markets / partnerships and simplifying distribution channels
- Government facilitation and support and associations between farmers / farmer groups
- Strengthening financial aspects
- Planning for better distribution patterns
- Conduct market research, monitor and supervise prices.

B. Distribution System Model

The determination of the distribution system model is designed based on decisions determined by: 1) Location of supply, factory, warehouse, and distribution center 2) distance, cost and time, 3) Mode and means of transportation (Simchi-Levi, *et al*, 2008).

The 3 elements must be able to meet the distribution system / channel with a reliable design and model. The perspective on the development of the distribution system / channel in the field of Agriculture is experiencing a shift and development that is initiated from the intermediary model in the case of the mobile industry, the company becomes a multi-functional actor involved in various distribution arrangements with business partners (Olsson,et.all,2013).

II. METHODOLOGY

A. Inclusion Criteria

There are 2 inclusion criteria in selecting articles to be reviewed:

- Searching for articles is done by keywords such as "Distribution Logistic System of Agriculture",

"Distribution System of food Logistic", "Distribution Logistic Center Model's," Wholesaler "," Food distribution Logistic System ", Policy and Strategy of Distribution Logistic System, "Distribution Channel Food Logistics"

- The article review focuses on several variables such as distribution channels which can be grouped into two (2) types, namely 1) Old Paradigm Distribution channels 2) New paradigm distribution channels.

Distribution system / channel strategies and policies are grouped into 4 namely: 1) Direct shipments, 2) Warehouse Delivery, 3) Cross Docking, 4) Online Delivery, with regard to determining and managing the distribution channel structure. Evaluation of distribution channels is carried out using a number of criteria, namely distribution costs, market coverage / market penetration, customer service, and communication with the market. Priority System Strategy / distribution channel using Hierarchy Process Analysis / AHP which has high flexibility.

Distribution System Models are designed based on decisions determined by: 1) Supply, factory, warehouse, and distribution center locations 2) distance, cost and time, 3) Modes and means of transportation with respect to Trading Systems and Commodity Distribution Patterns affect supply and demand control in commodities, there is a need for detailed information to model distribution channels and create agricultural distribution centers. Determining the location of facilities for logistics centers is one of the most important management decisions, location selection for logistics centers can be done by identifying geographic areas based on The Center of Gravity. Original models and solving methods, and decision support systems (DSS) for implementing strategic planning, tactical planning and planning. A review of the Agricultural Logistics

Distribution System in the context of Establishing a distribution center requires the selection of articles and limits on the scope and methods used can be shown in figure.

B. The Process of Finding and Choosing Articles

The journal article database is tracked from several publisher and web sites such as: Springerli, Elsevier Science Direct, Willey, and Google Scholar. The source is most often used and many standards to produce citation data for research assessment purposes. Distribution Logistics System of Agriculture "," Distribution System of food Logistics "," Distribution Logistic Center Model's "," Wholesaler "," Food distribution Logistic System "," Policy and Strategy of Distribution Logistic System ", Distribution Channel Food Logistics" Key phrases to get all the literature related to the Agricultural Logistics Distribution System. The articles obtained are filtered with the appropriate topic to obtain the articles reviewed. Articles are also distinguished based on the methodology used in each study, consisting of: (1) a survey; (2) case studies; (3) workshop; (4) theoretical and conceptual articles; (5) modeling; and (6) literature review (Seuring and Müller, 2008). Surveys and case studies are the two most common empirical research methods. Case studies are in-depth investigations of research objects. In case studies, every aspect of the research object is analyzed to look for patterns and causes of behavior. Next, modeling tries to mimic the operation of real world processes or systems from time to time. The methodology taken in the literature reviewed will help to understand the agricultural logistics distribution system from a different perspective from the methodology point of view. This will highlight that the methodology taken to solve a problem depends on the problem itself, available data, computational resources, and the researcher's preference for using a particular methodology.

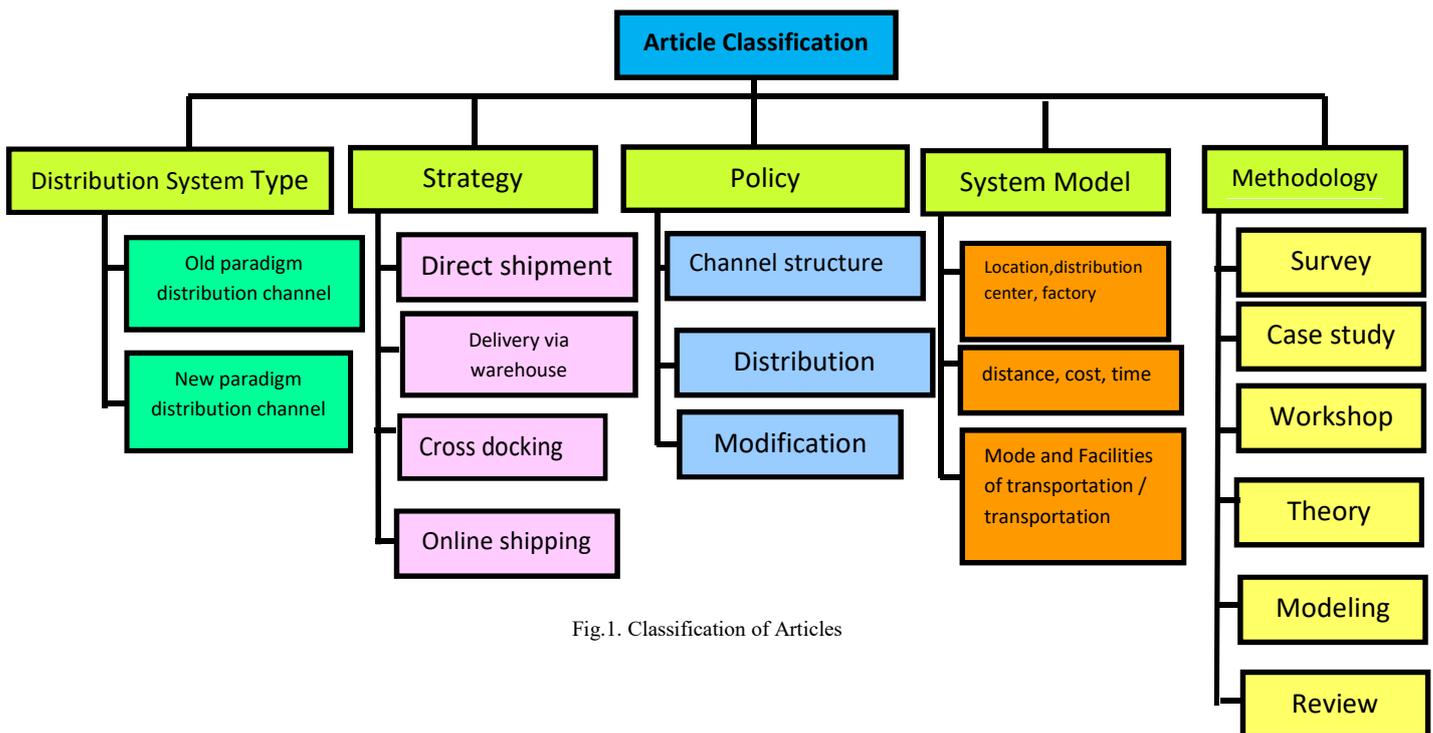


Fig.1. Classification of Articles

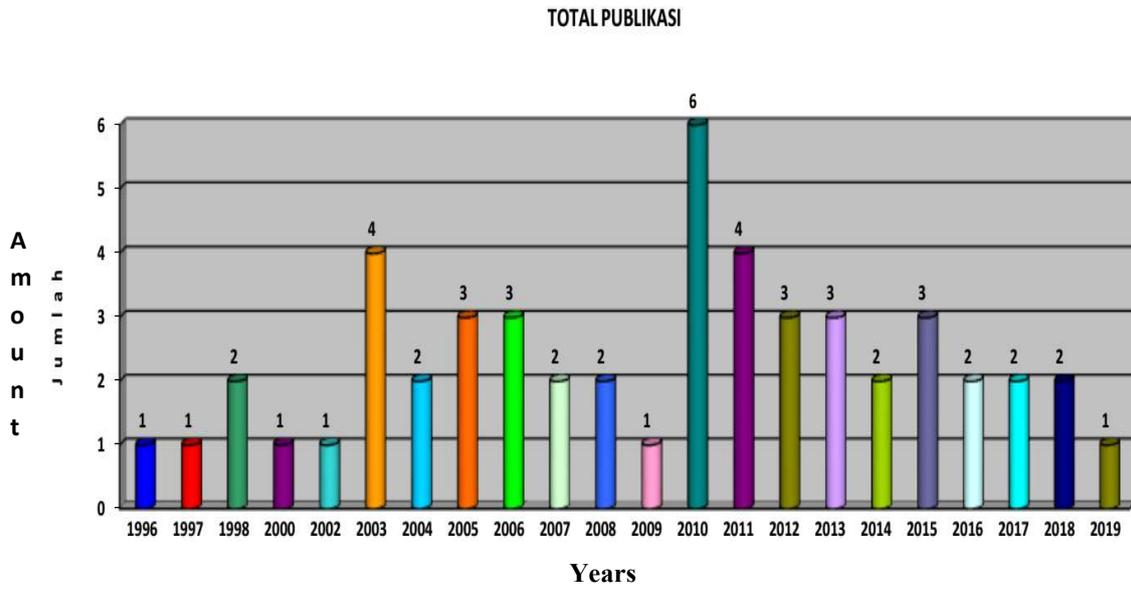


Fig.2. Total publications per year (1996-2019)

C. Analysis of Selected Articles

This section presents an overview of the literature survey. The total publication for each year is shown in

Figure 2. Distribution of articles based on journal titles and impact factors can be seen in Table 1.

TABLE 1. DISTRIBUTION OF ARTICLES BY JOURNAL TITLE

Group	Journal Title	Articles
Journal	Journal of Manufacturing Technology Management	1,27,55
	Journal IEEE Transaction on Engineering management	41
	Journal International of Urban science.	26
	Intertional Journal of Productions Economic	5,14,15,23,33,37
	Industrial Management	36
	Journal transportation research	30
	European Journal of Operational Research	1,10,27,55
	Springer International series	17
	Journal Transportation Research part E	32,57
	Journal of Retailing	29,47
	Journal procedia Social and Behavioral Sciences	7,8,25,41
	Journal Industrial Marketing Management	48
	Europe international jurnal of physical distribution & logistic management	31,56
	Journal of transport geography	19
	Journal of Economic and Policy	51
	Journal of the academy of marketing science	2
	Journal of business to business	11
	Jurnal Agriekonomika	22
	Journal International of Urban science	26
	Journal of manufacturing technology management	35
	Journal of food engineering	42
	Journal of Industrial Marketing Manajemen	48
	Jurnal Ilmiah Teknik Industri	38
	Journal of economics and policy	51
	Asia Pacific journal of marketing and logistic	54

	Journal Computer and Industrial Engineering	4
Prosiding	Seminar Nasional teknologi dan komunikasi terapan (semantic),2011	24
	The 5 th Indonesian International Conference on Innovation Entrepreneurship and small business (IICIES)	43
	Seminar Nasional SNPPTI	21
Bulletin	Sistem operasional manajemen distribusi	52
	International of artikel	12
	Marketing channel ,pearson education	9
	An iterative approach for distribution chain design in agile virtual environment	20
	Penentuan rute truk pengumpulan dan pengangkutan sampah di Bandung	12
Others	Supplay Chain Management	39,40
	Managing the supply chain: strategy perspektif,London Macmillan press	16
	Multiple criteria decision analysisi,springer internasional series	17
	Heuristic algoritm for the constrained location routing problem	18
	Creating distribution strategy	42
	Designing and managing the supply chain	46
	Pemasaran modern jilid 1	50
	Pemasaran Jasa Jilid 1	53
	Pemasaran Strategic jilid 2	54

D. Analysis of Selected Articles

This section presents an overview of the literature survey. The total publication for each year is shown in Figure 2. Distribution of articles based on journal titles and impact factors can be seen in Table 1. These articles were selected from the journals of Production Economics, Transportation Journal, Logistics Business Journal, Journal of Social and Behavioral Sciences, Journal Retailing, Journal of Industrial Marketing Management, and others

III. RESULTS AND DISCUSSION

In this literature we look at the development of distribution systems / channels and implementation beginning with the types of distribution systems, distribution system policies and strategies, models and designs of distribution systems. The literature review covers survey methods, case studies, workshops, theories, modeling and review.

A. Overall Review of the Distribution System

Literature review shows that around 75% of articles are at the concept level and around 25% articles are at the practical level which is an empirical study of the various real applications of distributed systems. This shows that distribution system research is still dominated by conceptual patterns with outputs in the form of discourse, guidance, and recommendations for operational implementation. In a practical article, there seems to be no practice close to the ideal of a distribution system, namely by collaborating all types of distribution oriented systems

channels, strategies and models in which each distribution system has a cash flow of usage and usage.

This review also looks at the development of distribution system models, where the current concept of the model has led to the implementation of a model that is able to provide information on the presence of products during the distribution process, logistics distribution services for fast food supply chains with reference to up-to-date information and communication services, network design that helps industry / company related to supply chain configuration and has a significant impact on logistics costs. The discovery of a distribution system model that is able to determine the location of facilities, distribution centers and design models for decision making / DSS in tactical planning, strategic planning and multi-commodity operational planning in production, distribution and transportation systems, in addition to finding ideas for distribution network investigations with stochastic models for optimize the distribution chain.

The review also saw the development of distribution channel systems that experienced rapid development from direct channels (40%) to online delivery (20%). Priority System Strategy / distribution channel using Hierarchy Process Analysis / AHP which has high flexibility.

The development trend of online shipping is currently increasing along with the development of distribution (transportation) to overcome them, this is supported by modes and means of transportation which become an important access in the development of the current distribution dynamics.

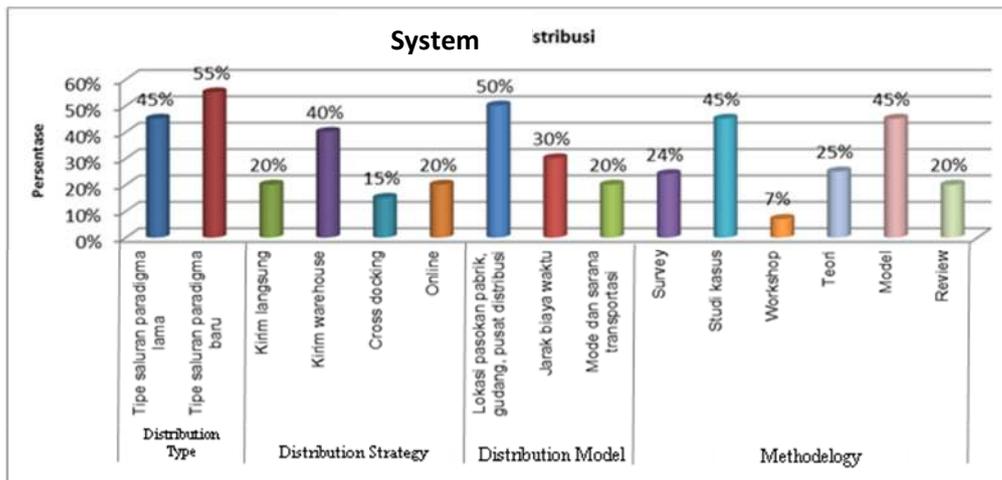


Fig.3. Overall Distribution System

IV. CONCLUSIONS AND RECOMMENDATIONS

Based on a systematic literature review of 61 articles, this paper classifies the distribution system based on:

Types / types of distribution channels consisting of old paradigm distribution channels which have a percentage of 45% and new paradigm channel types that have a percentage of 55%,

Distribution System Strategy and Policy has a 40% percentage of articles direct shipping strategy 20% of warehouse delivery articles. Cross docking has a percentage of 15%. Online shipping has a percentage of 20%.

Distribution system model that is designed based on decisions determined by the location of supply, factories, warehouses and distribution centers has the highest percentage of 50% .

Distribution system models designed based on decisions determined by distance, cost and time have a high enough percentage of 30%.

Distribution system models that are designed based on decisions determined by modes and means of transportation have a percentage of 20%.

The research method is 24% survey method, 45% case study method, 7% workshop method, 25% theory method, 45% modeling method and 20% review method.

The literature review shows that about 75% of articles are at the concept level and 25% of articles are at the practical level which is an empirical study of various real applications in the distribution system. This shows that distribution system research is still dominated by conceptual patterns with outputs in the form of discourse, guidelines and recommendations for the implementation and implementation of operations in certain cases. In the practical article it appears that the distribution system is carried out only partially in certain parts. Some research in the case study is oriented to distribution channels that increasingly follow the new paradigm that utilizes information, in distribution system strategies and policies that refer to distribution patterns by combining the existence of agricultural distribution / logistics simulation systems to support supply locations, market coverage,

market communication and customer service. Research on the distribution system model is oriented to the design of agricultural distribution systems that are oriented towards capable distribution centers to act as a buffer in distribution involving the location of supply, distance, cost, time and mode of transportation to meet customers.

The hope for the future is the establishment of an effective, efficient, equitable and sustainable agricultural food distribution center system from farmers / producers to customers / consumers by maintaining supply, price stability and product quality

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