Agro-industrial Supply Chain Development with Cluster System Approach: A Systematic Literature Review and Future Research

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***Abstract*— A supply chain is defined as strategic framework which based on network structure, business process and management components. Information and knowledge sharing along with power are focus of relationship mechanism. The purpose of this literature study was to identify factors that influenced in developing of Agro-industrial supply chain with cluster system approach. All this characteristic and possibilities are main areas of interest in cluster concept. The interaction between actors in the supply chain and with other institutions that are mutually synergistic and competing in the proper flow of information within a region transformed through a cluster system approach. The concepts of cluster system indicated efficient instrument to achieve value chain effectiveness and competitive advantages of the product and process along the supply chain. The collaboration of supply chain and Agro-industrial cluster can be definitely increase the competitive advantages of stakeholder that are the key to survive and development of many economic entities and enterprises. The finding of this literature study is elaboration the linkage of three components of the cluster system as a gap to overcome the institutional barriers and economic evaluation determinant of the region in Agro-industrial supply chain management and provide institutional innovation as one of large synergetic effect. The production of high value added of product in the existence of value chain indicated that supply chain management concepts has successfully been implemented within the cluster management system.**

***Keywords*—** *cluster system, Agro-industrial, supply chain management, competitive advantages, institutional barriers*

1. Introduction

The small and medium entrepreneurs face two challenge in responding to the opportunities offered by the world market: (1). the business actors are transformed by increasing their competitive advantage [1], and (2) business actors take advantage of the synergies through built cooperative relationships between small business actors and related institutions [2]. This synergy is built from upstream to downstream to produce some product in supply chain management framework. Supply chain management approach is applied to reach efficiently integration among the suppliers, entrepreneurs, warehouses and other storage areas, so that products can be distributed with the right quality, place and time to reduce costs and satisfy customers. Supply chain management purpose to make the system more efficient and effective, minimization of distribution and transportation cost, reduce the cost of inventory cost. The properly of supply chain management will provide a strategic opportunities to create competitive advantages [3]. From some literature related to the concept of business transformation that synergies with related institutions from upstream to downstream to improve the effectiveness and competitiveness of products is cluster concepts.

Now days, among the stakeholder in supply chain depends each other, they are no self-sufficient rather they corporate. Cluster concept presents an efficient instrument to achieve value chain effectiveness, competitive advantage of the product. Through the cluster approach, it can identify policies and

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institutional barriers of supply chain implementation especially in the agriculture sector. The cluster becomes one of the important determinants in the economic evaluation of a region and can identify several different phases in the life cycle of a region. Clusters also represent the basic organizational framework for understanding the economics of a region and developing economic strategies in the region[4]. The formation cluster approach by considering the affirmative synergistic effect of regional agglomeration, network effects, and diffusion of innovations could become the accelerator of the development of social and economic attitudes for difficult regions. [5] Through the cluster integration give the numerous benefit such as increase innovation capacity, flexibility of specialization and economic scale which cause the number of clusters in the world is increasing [6].

Development cluster begins in the industrial sector in recent years cluster develops into other sectors such as agriculture. Although the cluster formation in the agricultural sector is slow and focused on clusters for estate crops, but can adopt and develop for other sector. In order to specific regional cluster, development of regional clusters is one of an important competitive advantage of the modern economy, which provide a real synergistic effect, as the basis of regionalism in the global economy [5]. In the development country, agroindustry still have many problem especially to increase the farmer's welfare and weakness of integration among stakeholder along the supply chain. The uncertainty conditions was caused by asymmetric information which give effect un-stabilization of price in producer and consumer and relationship among stakeholder in the system of supply chain did not put in to the function of each stakeholders.

The interconnectivity between industrial cluster (IC) and supply chain management (SCM) have been discussed in several contributing articles. SCM and IC are two different areas of study, which shown in some of articles about the interest of integration and their benefits [7],[8],[9],[10]. Rarely, it discuss about comprehensive review and examination articles of the integration of supply chain and agro-industrial cluster theories. The outcome of this review will give the significant contribution to summarize the efforts made up and to identify future research direction to reach a good solution of performance in agriculture sector.

Therefore, this literature study purpose to identify some factors as gaps which influenced in developing of Agro-industrial supply chain with cluster system approach and to suggest potential possibilities for future research areas. In order to achieve the objective of this paper a systematic literature review of articles published in international journals has been made using content analysis. This is followed by a brief discussion on the methodology adopted for the study. Within the analysis and discussion section, the integration of supply chain and agro-industrial cluster articles have been reviewed. In the final section of the paper, concluding remarks and opportunities for further research were given.

2. Method

2.1 Critical Review Framework

In the development of cluster research, many researchers propose various components in clusters such as characteristics, value chains and competitive advantage. We categorize this critical review into 5 main topics, they are agro-industrial supply chain development, cluster, and characteristic of cluster, value chain, competitive advantages. Institutional supply chain strengthening in cluster system and prospect future research as. The agro-industrial supply chain development describes the configuration models which are mostly discussed in the literatures. Clusters, characteristic of cluster, value chain and competitive advantages topics explained the definition of cluster and was identify the linkage these components based on a previous literature. This paper focused to identify the linkage of three component as gaps which influenced the agro-industrial supply chain development in cluster system. The institutional strengthening could improve performance of the value chain and competitive advantage within agro-industrial supply chain cluster system. Finally, in the end of the review, we suggest a global framework. The framework of this review is depicted in Figure 1.

2.2 Scientific articles sources and the year of publication.

This review have 4 keywords to explore: cluster, factor and characteristic of cluster, value chain and competitive advantages. We have reviewed from 80 articles correlated to our main topics. The resources of this review from scientific journal, books, PhD thesis, guidelines and proceeding which published from 2005 until 2018.

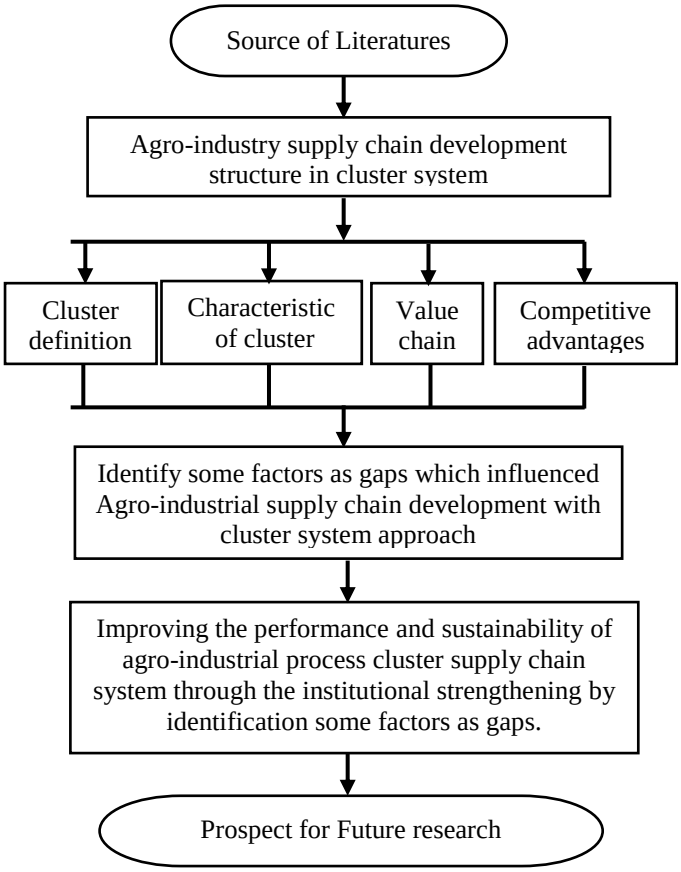

Figure 1. The Review Framework and Structure

The literature review material sources based on main topics is divided into 1 definition and 3 approaches and defined in Table 1.

Table1. The number of scientific articles on each main topic

No	Main Topics	Quantities
1.	Cluster Definition	8
2.	Factor and Characteristic of Cluster	9
3.	Value chain	10
4.	Competitive advantages	17
	Total	**44**

The main topics discussed in many cluster-related scientific publications are respectively competitive advantages, value chains, cluster definitions and cluster characteristics. The distribution of the number of publications of main topics is depicted in Figure 2.

Table 1 and Figure 2 showed the competitive advantages is main topics in 13 years. The increasing competitive advantages could be one of potential innovative for development of regional cluster.

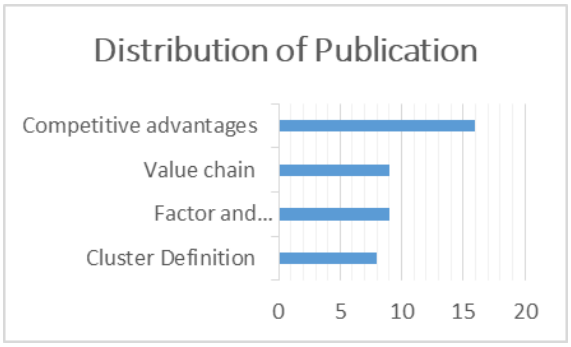

Figure 2. Distribution articles publication

Integration and elaboration between supply chain management and industrial cluster in agricultural field will definitely increase to the competitive of stakeholder in cluster system. They are a key to survival and development of many economic entities and enterprises.

3. Findings

3.1 Agro-industrial supply chain development in cluster system

The industrial cluster has evolved as an alternative economic development strategy in various countries. This evolving cluster takes advantage of geographic proximity and benefits by generating economic growth in a region. An industrial cluster is interconnected concentration of geographically which was operating business together within the same commercial sector and whose activities rely on certain local specificities such as availability of natural resources, centre of technology development through universities, research centre, technology parks or a technology-based industry, and a consolidated productive structure for all tiers of the productive chain of the region [11].

A supply chain is dynamic condition which was involved the constant flow of information, product and funds between different stages[12]. Supply chain management is a transformation process that a interaction of business actors from upstream to downstream with relevant institutions in the right flow of information thus is running within synergy and remains competitive. Supply chain management is understood as a large company that connects businesses in different places and facilitates allies to encourage competitive advantage in the era of globalization [13].

Supply Chain Management (SCM) and Industrial Cluster are different areas of studies. Some articles

have presented some of benefit and integration both of them [7],[8],[9], [10]). In general, supply chain management consist of sourcing raw materials and parts, managing supply and demand, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customers [14]

An industrial cluster is an agglomeration of suppliers, companies, service providers, and associated institutions in a particular field and often included are financial providers, educational institutions, and various levels of government [14]. The cluster elements get the economic benefits because of they are linked by specific externalities and complementarities of different types and are usually located near each other [15]

Cluster supply chain is a new economic theory to improve competitiveness and face global challenges through all kinds of collaborative strategies for SMEs through vertical and horizontal cooperation. Cooperation between upstream and downstream enterprises within a single supply chain that SMEs can strengthen their competitiveness to reach a high-value added segment by utilizing shared capabilities and resources (vertical cooperation). And cooperation between homogeneous enterprises across different supply chains located in the same cluster, which SMEs can achieve a breakthrough in some critical segments of the value chain (e.g. strategy development, core technology and workflow optimization) and even compete with industry giant in international market (horizontal cooperation) [10]

In some developing countries, the agricultural sector shows great and sustained growth potential. Ironically, however, poverty in this sector is the largest with small-scale farmers, low levels of productivity in rural area, margins, investment and low market orientation[16]. To achieve a new agricultural era, a new device is needed to provide innovation and compete. One potential device is cluster formation.

Agro-industry cluster approaches can identify all actors involved in the agricultural value chain to innovate and succeed with supporting institutions and another supply chain actors [17]. The agroindustry cluster focuses on producers, agribusiness entrepreneurs and related institutions in the same sector with equal challenges and opportunities. With the agriculture-based industry cluster approach, the involved actors can further innovate with interaction with their supporting institutions and other actors in the supply chain. Industrial clusters serve as liaison or facilitators to other organizations such as government and NGOs, can improve access to markets and information. Cluster policies are important, especially for small-scale farmers and agribusinesses, as they enable them to engage in higher productivity, more market-oriented with higher value-added production.

The challenge for the industrial cluster is a). economic scale, b) competition with outsiders c) improving food safety standards, d).new markets for products, e) less focus on efficiency and productivity, f) more focused on consumer demand In addition, industrial clusters contribute to the identity of a region (Brand) and connect with tourism. An agro-industrial cluster must have the following eight components:6 1) a group of horticultural export companies, 2) designers of public policies, 3) research and development institutions, 4) educational institutions fostering human resources, 5) financial institutions, 6) suppliers, 7) agro-industrial enterprises, and 8) clients[18]

This agriculture-based cluster is needed to address market failures, government policy failures, and systemic failures. With agricultural clusters, it is expected that incentive improvements for producers and agribusiness actors will be provided, providing key products, improving the investment climate, building effective institutions, reducing environmental barriers and supporting export policies and policies. The advantages of agricultural clusters are a) facilitating cooperation among actors in it, b.). Encourage the diffusion of innovation c.). Efficiency in distribution of funds / assistance and d). Improve competitiveness.[17].

The basic requirement of agro-industry cluster development are as follows: the establishment of legal and regulatory frameworks: private sector development; the construction of close relationships among participants of cluster; development of technologies in every value chain such as production, processing, storage, marketing and so on; an extensive financial support and investment promotion for the related industry development by constructing a banking system, and necessary infrastructure [19]. An important factor in the process of cluster development, especially in agricultural complex is the development and implementation of public policies to support cluster development [20]. The outcome of agro-industry

cluster development in transition economies can be summarized as follow: poverty reduction, increasing the job opportunities for women and improving the balance of trade[19]. The benefits of clusters as an improvement in productivity as well as farmer income and proposed spillover effect in the form of increased farm employment [21].

3.2 Cluster

Cluster has two meanings: it is a category for describing a situation and a tool for promoting regional development. In the first meaning, described the interlinked companies and institutions located in a particular territory. In the second meaning, one of development strategy to promote innovation and coordination of production activities of stakeholders located in a certain territory, to successfully confront the challenges of economic globalization.[18]. In cluster system have the vertical and horizontal linkage. The vertical linkage is a linkage between the main industry and the supporting company like supplier industry, and the horizontal linkage is a link between the main industry and other complementary industries, private and public institution in technology and marketing. Clusters are also defined by [22] which states that clusters are activities consisting of supporting industries, and economic activities / supporting sectors and related to each other, which in their activities will be interrelated

A variety of cluster conceptualizations whereby several things have focused entirely on the relationship between the company and some of the more widespread including already established relationships[23]. The clusters are a simple geographical form that focuses on the relationship between firms and institutions on an adequate scale to produce an externality[24]. An industrial cluster is a business group, closely related economic and institutional actors, who are close to each other and describe the productivity gains resulting from their relationship and interconnection [4]. Cluster also stated that the economic grouping by people in the city is more to reduce the cost of transporting goods, people and ideas [25]. Clusters comprise firms from a region where was produced similar products by utilizing the same process with involving functions in businesses such as marketing, development and research, suppliers and customers, having manpower from the region [23]. Clusters comprise firms from a region producing similar products by utilizing the same process by involving functions in businesses such as marketing, development and research, suppliers and customers, having manpower from the region itself[23]. Through training programs provided by the government and cooperation with the private sector to provide services to cluster members. Cooperating with other institutions such as universities, industry outside the region, associations to develop knowledge, growth of innovations and cost savings for products and processes. Cluster defines as a geographic concentration of industries that create ‘value networks’ that aggregate vertical relationships along value chains with horizontal relationships among producers[17].Clusters are a natural manifestation of the specialized knowledge, skills, infrastructure and supporting industries in enhancing productivity as the key determinant of sustaining high levels of prosperity in a location.[26]. One of critical point is cluster boundary which sometimes not to be consideration of the cluster definition. Cluster are an effective organizational model of connecting business that contribute to economic and technological development of primarily, small and medium size companies[27]. Cluster have two common dimension, geographic and functional. At the modern concept of cluster, geographic dimension were the drivers of urban and regional development and main criterion to classifying clusters. The functional one refers to the interconnection among cluster members. However, the most important definition of the cluster is the internal relationships of all cluster members and the formation of relationships within the cluster.[6]. The all actors in the agricultural value chain was recognized by cluster approaches are often more innovation and successful when they interact with supporting institutions and other actors in the supply chain [28]. Key element of the cluster are geographic concentration, self-organization, network organization, systematic, interdisciplinary nature, unique character, research intensity, innovation.[29]. Agricultural Cluster is a geographically concentrated network – system of mutually complementary market entities which focused on the production, processing and sale of foodstuff, creating innovative products that address the socio-economic development of rural areas, environmental protection, and local solutions to global problems, etc. and with unique competitive advantages of location, use of science, innovation, know-how, strategy to be "unique" [29].

3.3. Characteristic of cluster

The cluster becomes an important factor in the economic evolution of a region by identifying and understanding the life cycle / phases in different cluster that are critical to a region's policy. Cluster development resulted in 3 implications: grouping economically, grouping with unequal growth and clusters consisting of the same components [23]. There are two concepts related to economic grouping: cost decreases but increased productivity, and network effects where the value of products and services produced increases [30]. The cluster is one of four types of groupings economically. Clusters are formed through companies that engage in the same field and innovation is an important force with its fuel competence and business development [31]. In other literature, cluster consist of geographic dimension were the drivers of urban and regional development and main criterion for classifying clusters. The second dimension is functional refer to the interconnection among cluster members.[6]

Clusters are categorized into two types: clusters formed from natural geographic and clusters formed form only less than 20% of their natural geographical advantage [32]. The first type of cluster provides an inexpensive advantage of energy and labour and large ownership of its natural resources such as large forests.

Cluster characteristics are as follows [33]:

1. Regional economic activity is at all levels: community, geographic area, global
2. Limited to certain industries;
3. Vertical relationships between supplier-manufacturer-agent-customers and horizontal relationships generated in sectors in the same industry
4. Firms have the same and interrelated business areas.
5. These companies compete with each other but with the specialization, they have contributed to cluster development.
6. These companies have close proximity to each other resulting in social relationships and trust
7. Infrastructure is generally used derived from innovation through technology transfer supported by universities and research institutes.

The main characteristic of the cluster is the spatial centralize concentration of several companies, meaning the grouping in a certain region or region of various companies residing within the same sector. The geographical criteria only lies in how efficiently and economically the distance between regions is and how profitable the activities undertaken by each member in a cluster. Thus the cluster mapping is not merely classifying a particular industrial sector within a particular area, but a more important identification is the map of linkage and integration between the cluster industry and the various supporting institutions. Cluster approach focuses on the relationship and interdependence between actors in the production network when producing and providing services. The operational characteristics of clusters as follows [34]:

1. Clusters managed by entrepreneurs and the general public
2. Cooperation and competition are fundamental
3. A strong relationship between companies and public institutions of a general nature
4. Cluster is a system where each member has an interest
5. Cluster members have general technology, customers, distribution channels or labor markets and human capital

The important feature of the cluster is organization, as an industrialized strategy, the cluster refers to a consciously organized and organized activity. Clustering refers to the phenomenon that the existing holds, not randomly distributed, are deliberately organized in a particular area.

In industrial clusters, it built the cooperation between industries, namely the core industries that are the basis for cluster development with supporting industries and related industries that are intensively linked to form partnerships [34]. The clustering of industry clusters is usually based on the systematic product, the characteristic of the product and industrial tree.

The cluster divided into 6 types based on process, intercultural interaction, membership, method, the cluster core, growth of the cluster[23]. In the third type is added membership category with scope coverage, fifth type with wage rate, and type six with the level of skill / skill of its workers. Clusters with internal and external components such as systems in the body where actors are assumed to be organs, tissues and interactions assumed as arteries, knowledge, technology and innovation as blood, the influence on the cluster economy as health for the human body[35]. The cycle of cluster divided into 4 phases of the beginning, growing, mature / maturing, and decreasing phases [36]. A non-deterministic model proposed for the cluster life

cycle, emphasizing the importance of inductive and narrative approaches as a historical driver for understanding long-term cluster evolution[37]. The clusters divide based on their development and knowledge base[30]. Flow of cluster consist of vertical cluster concentrate to raw material up to supplying product and horizontal cluster concentrate to process up to supplying work in process to the global supply chain. In this flow, geographical proximity plays the most critical role in integrating key players of the cluster[14].

3.4. Value Chain

The concept of clusters is actually more towards the full integration of all activities along the value chain. The main objective of this cluster concept is to increase the added value of the upstream activities to the latest activities and encourage specialization (core competencies) to be competitive. Clusters as a value added in the production chain[38]. Cluster development should be integrated with the value chain for the purpose of promoting competitiveness based innovation[39].

The development of value networks is an effective way of addressing the above issues and simultaneously raising the prospects for the competitiveness of the agricultural sector over the long term. Value networks are an aggregation of:

- Vertical relationships between raw material suppliers and production inputs, agricultural producers, processors and exporters, branded buyers and retailers;
- Horizontal relationships between producers, which take the form of farmers, cooperatives or various types of smallholder business consortiums;
- Support relationships between manufacturers and organizations facilitate (e.g. local government, business service providers, research institutes, universities and non-governmental service organizations) that strengthen quality, efficiency and aspects of sustainability of the chain[16]

Value networks in the agricultural sector are growing slowly, businesses being done on a small and traditional scale by the majority of farmers. Farmers do not get the opportunity to earn less income or profit or the added value of the products it produces. Farmers are considered not as "price-makers" but only as "price-takers" Transactions made when selling and producing

This cannot happen when there is wide integration in the value chain that can be achieved through vertical relationships in producing products such as farming contracts and planting investment schemes, coordinating in financing and strengthening communication among stakeholders[16].

The cluster approach has already begun to be widely applied in agriculture; this is related to the added value generated from the value chain and the competitive advantage generated from the value chain. Cluster development should be in line with the improvement of the value chain if cluster development aims to promote competency-based innovations where (1). The parts of the value chain such as transport, distribution and the environment are often unstructured and thus require the intervention of many non-resolvable stakeholders own. (2). The level of trust among stakeholders is still low especially in efforts in building social capital. (3). Barriers need to be addressed by various stakeholders and the value chain[39]. With the approach of developing a broad integration, agricultural cluster as mentioned above can run well. The potential benefits of clusters related to agribusiness activities are: 1). Increased productivity, 2). accelerate the growth of innovation and 3). New business formation.[40]

Most agricultural land is away from large business and industry activities so that cluster approaches in agriculture must be through collaborative and cooperative activities to promote growth and equity so as to foster sustainability in economic development. The agriculture cluster consists of producers, industry, traders, private actors and public institutions engaged in the same industry and in relation to building a network both formally and informally to achieve the same goals.

Based on the above concepts, the expectations achieved from the cluster concept in agriculture is a condition where each part feels advantaged and will be able to work optimally and professionally in their respective parts. Farmers do not hesitate to cultivate crops as raw materials, collectors and traders will think about the efficiency and effectiveness of the business, the core agroindustry will maximize their business management capabilities, consumers will feel satisfied with the price and service.

3.5. Competitive advantages

The basic objective of an economic policy is to improve competitiveness. This growing competitiveness comes from improvement,

innovation and change. Competitive advantage involves managing the entire value system, including the enterprise value chain, suppliers, and buyers. Cluster with the unique condition have a unique competitiveness. The strongest competitive advantage, observed by Porter, often emerges from groups within the local area. This local area characterizes the regional economic characteristics that are the source of competitive advantage with an emphasis on the institution. The competitiveness level of a cluster can be measured by looking at market share, growth in value added, and gross production of clusters[41]. In Porter's perspective, the determining factor of competitiveness is the interaction of four specific factors and two external factors called the Diamond Model (DM). The four factors are

- Input Factor Condition: refers to inputs used as factors of production, such as labour, natural resources, capital and infrastructure. According to Porter, the key factor of production is "created" not the acquisition of inheritance. The scarcity of resources often helps the country become more competitive, and the thing that happens when too much resources are available is likely to be largely unused, the implication of the scarcity of innovative impetus.
- Demand Condition: refers to the availability of market opportunities, especially domestic ready to play an important element in generating competitiveness. Markets such as these are characterized by selling superior products thereby promoting demand for quality services and the proximity of relationships between supply chain actors such as companies and customers.
- Related and Supporting Industries: refers to the strong attachment between supporting and corporate industries, positive relationships and support so as to achieve increased competitiveness. Porter developed a model of this kind of condition factor with an industrial cluster or grouping that benefit from potential technology knowledge spill over, proximity to the consumer, increasing market power.
- Firm Strategy, structure and Rivalry: refers to the strategies and structures that exist in most companies and the intensity of competition in a particular industry.

Industrial cluster development is able to create sustainable economic benefits and industrial competitiveness. Competitiveness increase because cluster strategy can affect competition in three ways, namely: (i) increasing the productivity of the company; (ii) controlling the direction and step of innovation that serves as the foundation for future productivity growth; and (iii) stimulate the growth of new businesses that can expand clusters.

4. Discussion

4.1 *Current Issues*: Institutional Strengthening in Cluster System

The main efforts to identify and promote possible measures and state policy of supporting the creation of clusters in agriculture should be directed towards building / strengthening links of these areas to the local economy and the integration of enterprises.

When mutually beneficial goals of the each stakeholders in cluster supply chain are not sufficient to cooperation among them, then organisational innovations of collective action to reach results desirable for all in the cluster are called for. Collective actions can also be launched when the individual initiative can result in free riding. Upgrade the cluster for government policies can also become more focused and effective through pursuing collective actions involving public and private sector.

Institutional innovations will build to give benefit for the actors along supply chain. Getting profit, value added, balance risk and facilities along a supply chain will improve the cluster performance.

In the achievement of the goals in the supply chain, the institution plays an important role in sustainability of the supply chain. The institutional includes actors along the supply chains, the mechanisms, patterns of interaction between actors, and their impact on improving the prosperity of actors in the supply chain. In the development country, institutions in agriculture field, especially upstream institutions (farmers / producers) have not been able to become a strong institution for business sustainability and have not led to improved profit sharing, value added and balance risks along supply chain.

The existing institutional level of farmers is still not able to increase the scale of the farmers' economy. To make institutional changes, it is necessary to identify actors, institutional mechanisms, opportunities and challenges faced by smallholders. Increasing economies of scale farmers can be through institutional strengthening into a farmer

economic institution. The economic institutional of farmers can be an institution representing farmers in institutional collaboration on the supply chain in the cluster system. To encourage the independence of farmers, the strengthening institutional farmers, through the institutional business incorporated as legal entities who consist of both individual farmers and farmer groups in a corporations to synergize business activities and empower farmers community with profit-oriented.

The economic institutional farmers will collaborate with the other company or another externally institution which support into cluster could give the benefit to all actors in cluster supply chain. Collaboration between institutions will be able to strengthen each actor in cluster supply chain. Institutional collaboration plays an essential role in connecting the parts of the business environment and fostering efficient collective actions for the provision of public goods. [26]

In agriculture filed, this collaboration will provide balancing profit, sharing risk and value added and sustainability of economic farmers institutional and other supporting institutional.

4.2. Prospect for future research

The integration of supply chain management and agro-industrial cluster has one important collaboration in increasing supply chain efficiency and effectiveness, which resulted the competitive advantages of product.

As mentioned the purpose of this study above to identify some factors as gaps which influenced in developing of Agro-industrial supply chain with cluster system approach and to suggest prospective for future research areas. Dominant factor were identified based on some literature such as value chain and competitive advantages. Through the cluster concept is to increase the added value of the upstream activities to the latest activities and encourage specialization (core competencies) to be competitive. The cluster development should be integrated with the value chain for the purpose of promoting competitiveness based innovation[39]. In the recent year, the cluster approach has already begun to be widely applied in agriculture, this is related to the added value generated from the value chain and the competitive advantage generated from the value chain. However, value networks in the agricultural sector are growing slowly, businesses being done on a small and traditional scale by the majority of farmers. Farmers do not get the opportunity to earn less income or profit or the added value of the products it produces. Farmers are considered not as "price-makers" but only as "price-takers" Transactions made when selling and producing.

Cluster development should be in line with the improvement of the value chain if cluster development aims to promote competency-based innovations [39][39] in supply chain network.

Agro-industrial cluster still rarely to explore especially in the development country. For development of agro-industrial cluster supply chain the following suggestions are essential to be pointed for future research. Some of aspects would be analysed in order to supporting the development of agro-industrial cluster supply chain such as:

1. Strengthening the function of institutional of each actors especially in upstream institution like farmers as producers with improved the capability and capacity of this institution so can synergize business activities and empower farmers community with profit-oriented. However, Interpretative Structural Modelling (ISM) as qualitative method use to analyse a system with identification relation between elements of institutional function[42].
2. To gain competitive advantages of product can be achieved from good supply chain performance in the cluster system as mentioned some literatures above, rarely, the performance of the supply chain was discussed. Supply chain performance needs to be measured to create supply chain conditions more effectively and efficiently in order to meet consumer needs of competitive products with fast services [43]. It consider to use the analysis of performance of supply chain
3. The problem in development country is still weakness of bargain position of farmers/producers. One of the effect is price fluctuation in production area. Deep aspect to build it, which is explore the agro-industrial cluster supply chain, is balance between added value and risk. Improving efficiency and effectiveness of cluster supply chain, it is necessary to consider continuous sharing of risk and value added among all stakeholders in the supply chain. Therefore, Agent based Modelling (ABM) method use to learning the interaction between agents who has the behaviour like at the real world[44] to evaluate performance and

information of behaviour in system. ABM was used to result the deal price recommendation. Therefore, in order to obtain the agreement price between actors in the cluster can be adaptive, analysis is done using ANFIS (Adaptive Neural Fuzzy Inference System)

5. Conclusion and Recommendation

5.1 Conclusion

This literature study was concluded that there needs to be collaborative strategies in the supply chain to face the current global challenges. The supply chains in agricultural cluster systems provided balanced and equitable added value from upstream to downstream for relevant stakeholders which to result competitive innovations by looking at the characteristics of the cluster.

The three components in the cluster system that are the gaps to provide a large synergistic effect for each stakeholder in the agro-industrial supply chain. An innovation is needed to give this synergistic effect can be held in harmony, one of innovation is the institutional strengthening

Institutional innovation in the supply chain this cluster system is built to give benefits for improving the performance and the sustainability of processes along the supply chain. This institutional can develop further through interaction with supporting inside and outside institutions of the cluster. Thus, the ultimate goal is to provide an equitable welfare improvement from every stakeholder in the agro-industrial cluster supply chain.

5.2 Recommendation

Agro-industrial cluster supply chain development policy should be considered exclusively from the process of regional development. These process should be complementary to the other development programme rather than substitute. It is necessary to develop and implement a clear and appropriate programme of all factors of the activities in cluster system. The aspects of institutional, performance of supply chain and fair profit distribution of cluster supply chain should be further analysed with advance tools to provide periodically adaptive information for Government Policy.

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