

# Uncertain Supply Chain Management

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## The factors influencing modeling of collaborative performance supply chain: A review on fresh produce

Edi Susanto<sup>a,b\*</sup> and Norfaridatul Akmaliah Othman<sup>a</sup>

<sup>a</sup>Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka, Malaysia

<sup>b</sup>Faculty of Industrial Technology, Institut Teknologi Nasional Bandung, Indonesia

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### ABSTRACT

The aim of this study is to identify and explore the success factors that influence the fresh product supply chain collaborative performance system (CPS) towards the flow of information among partners along the chain, and the supply chain relationships of all partners in it by identifying the role played by information structures at the planning level of supply chain collaboration, as well as providing policy insights to stakeholders in different countries to analyze applicable implementation. This research method uses a research approach by reviewing the previous literature that was selected deliberately during the last 10 years; journal papers, conferences, working papers, and Ph.D. thesis. Using three steps, the first step found 189 articles. The second step was to get 96 articles that match the topics raised. Finally, the third step, determined 39 articles selected as important topics focusing on fresh production areas and they were categorized and analyzed. This study is considered to be our best knowledge to examine the success factors influencing CPS in FPSC, such as; knowledge of the benefits of collaborative performance systems, reluctance to change, collaborative culture, trust, technology and information, social relations, environmental friendliness, and sustainability security and safety. The theoretical framework, was also developed incorporating the principles of supply chain network collaboration, taking into account the importance of business strategy and inter-organizational network theory, to strengthen the evidence for the relationship between the collaborative planning levels in usable information flow, at both the strategic, operational and tactical levels in the supply chain collaboration. The implication of this research is intended to examine the success factors that influence it, so that it can be developed and become the basis for improvement models that are still rarely applied in this field, from the influencing factors that exist in the collaboration structure.

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## 1. Introduction

The collaborative supply chain relationship according to Cao and Zhang, (2011) is a partnership process in which two or more autonomous companies work together to plan and carry out supply chain operations to mutual and mutually beneficial objectives. Meanwhile, Simatupang et al. (2008), define cooperation between independent, yet related companies to share resources and the ability to meet the needs of the most remarkable or dynamically changing customers. This allows it to increase the dependency between these actors, especially for resources and information due to the increasing pressures created by outsourcing, globalization, and rapid innovation in information technology (Arshinder et al., 2011). In addition, benefits of supply chain cooperative relationships, there is also an increase in interdependencies that sometimes become non-free from perpetrators into chains and can impede them from exploring better opportunities to tackle the changes occurring in the market.

\* Corresponding author

E-mail address: [edsusanto@itenas.ac.id](mailto:edsusanto@itenas.ac.id) (E. Susanto)

Previous research from different sectors examines the benefits of collaborative relationships between supply chain partners and proves to improve their CPS. The benefits of this collaborative relationship have been demonstrated in previous literature, which resulted in its benefits to the performance of their organizations in various industrial and commodity sectors, such as; fields of maritime industry in Korea (Seo, et al., 2014), distribution of fish produce in Indonesia (Prayoga et al., 2017), manufacturing in Finland (Sossay & Hyland, 2015); In Indonesia (Al-Shboul et al., 2017); China (Ip et al., 2011); Australia (Perera et al, 2019); Malaysia (Ahmad and Zabri, 2018); India (Nulkar, 2014), and in the United States (Blair, 2019), the retail field in Sweden (Selviaridis and Norrman, 2014), electronic industry in Malaysia (Sundram et al., 2015), beef industry in Australia (Storer et al., 2014), automotive industry in Germany (Wiengarten et al., 2010), the field of fashion industry (Moon et al., 2015), which discuss the agility and collaboration of supply chains widely as two major strategic tools to increase competitiveness in responding to markets such as intensification of globalization, increased competition, and deeper volatility (Derrouiche et al., 2011).

The benefit of the collaboration itself is not directly able to cope with market changes that require readiness in anticipating obstacles as well as the risks faced by the partners in one supply chain organization, so that the anticipation of the barriers to opportunities in the face of rapid market changes and difficult situations, because the factors that affect are also quite complex. To explore obstacles and create these opportunities, it is necessary for the evaluation and risk mitigation measures to make the right decision at the right time, to meet consumer demand and a system needs to be developed in chains to disseminate reliable, and perfect information about the market situation to all the chain actors (Li & Wang, 2007). For the supply chains of existing agro-industry sectors such as fresh produce commodities, in the dissemination of information only on the current market situation, many previous studies lack to discuss the two-way information from farmers to intermediaries/ distributors/ supermarkets/ exporters/ consumers and vice versa. These chain actors need strategic information, such as demand trends, the reasons behind the creation of demand, the interest and capacity of competing chains, and production and marketing technologies (Batt, 2006). Some studies have also reviewed the factors that influence performance in the commodity agro-industry sector fresh produce also includes other more specific factors in this field, which can affect the performance of supply chain collaboration, such as; knowledge of the benefits of collaborative work systems, desire for change, collaborative culture, trust, technology and information, social relations, environmental friendliness, sustainability security and safety, with a look at the existing businesses. It is constrained by the lack of coordination of existing collaboration structures; either vertically, horizontally, or lateral coordination.

To optimize these factors, the members collaboration in the fresh produce supply chain can streamline horizontal and vertical or lateral coordination (the combination of the two), there by synchronizing their production and marketing activities by market needs and product safety and business sustainability resulting from those factors. This important reciprocal relationship is necessary related to horizontal coordination, vertical coordination, and lateral coordination in the case of information flow, and needs to be understood by all parties, especially in cases of fresh produces, such as vegetables and fruits in developing countries such as Indonesia. Clarity is demonstrated on the factors influencing the performance of the collaboration of information flows impacting horizontal, vertical and lateral coordination, but the in-depth study of this phenomenon is still lacking. Therefore, related to cultivation decisions, information flows, business environment, and the relationship between supply chain partners. Although, the production of fresh produce has begun on a commercial scale by some farmers in Indonesia, many farmers are still in the period of adjustment from traditional to commercial systems. Despite such transition problems, remarkable growth has been observed in the cultivation and sale area of vegetables and fruits in Indonesia. According to Indonesia Ministry of Agriculture, from 2015-2019 years, increased the number of productions of vegetable commodities from 11.63 million to 12.78 million tonnes or up about 9.87%, and fruits from 19.85 million tonnes to 24.39 million tonnes or up about 22.89%. While on the next chain, as in the grocery there is a growth of the number of outlets 13.5% from the year 2016 against 2011 or about 17 thousand outlets (Global Agriculture Network, 2017). With such high growth, the need for efforts to strengthen the coordination between actors in the flow of information between them (Chambo, 2009; Cheng, 2011). Therefore, it is important to focus on this reciprocal relationship to gain broader insight, on the relationship between information structures and coordination in the supply chain. While the factors affecting the collaborative performance of this area are not yet studied, discussing how the factors influence collaboration in the fresh produce supply chain will be examined, related to the network theory between supply chain organizations. Further strengthening the evidence of the relationship between the level structure of the information or the level of vertical, horizontal and lateral collaborations by considering the reviews on collaborative planning conducted by the perpetrators in the supply chain at the strategic, operational and tactical levels to be an interesting part of the study. The organizations of the paper are; 1) the factors of influence collaboration supply chain in fresh produce based on the previous literature summary, 2) The explanation of the systematic review method, 3) The literature examination based on collaboration planning, 4) The systematic discussion of the findings and results, 5) the conclusions, and 6) limitation and recent development.

## **2. Literature Review**

### *2.1. Supply Chain Collaboration Performance*

Wiengarten et al. (2010) illustrated that the impact of the collaborative supply chain practice are; information sharing, incentive alignment, shared decision-making on performance vary significantly depending on the quality of information exchanged throughout the supply chain. The sharing of information is conceptualized as the act of capturing and disseminating timely and relevant information for decision makers to plan and control supply chain operations, decision

synchronization refers to joint decision making in the context of planning and operational and incentive alignment refers to the extent to which the member supply chain shares costs, risks, and benefits (Simatupang & Sridharan, 2005). The study of Simatupang and Sridharan approaches by measuring the collaboration of supply chains in terms of information sharing, incentive alignment, and shared decisions or synchronization practices.

In addition, researchers in previous studies have begun creating the concept of collaboration by linking it with relationship-building activities such as incentive alignment and decision making (Simatupang and Sridharan, 2005; Matopoulos et al., 2007; Nyaga, et al., 2010). However, there seems to be a tendency in the literature that newer research that recognizes the role of supply chain collaboration on fresh produce, the more complex has shown more diverse results.

## 2.2. Supply Chain Fresh Produce

The definition of the fresh produce, according to the British Growers Association (BGA, 2020), is fresh produce including plants that are sent to consumers immediately after being harvested. Included in this definition are fruits and vegetables, which are usually sold in 'fresh' conditions and have a short shelf life (Relf, 1992). While the collaborative supply chain collaboration relationship in the fresh produce network in the previous research in Indonesia consists of; farmers, intermediaries, retail/exporter, and consumer.

Fresh produce consisting of fruit and vegetable market in Indonesia has evolved from short and linear supply chains under the supervision of the Agriculture Department, becoming a very complex supply chain, more diverse, and progressively coordinated. The fresh produce supply chain includes a large number of farmers who plant different vegetable and fruit varieties on their own land. Traditionally, they sell their vegetables directly to entrepreneurs, food processing industries, wholesale markets, cooperatives, retail stores, and supermarkets. Domestic demand and export opportunities have encouraged the rapid expansion of fruit and vegetable production and business in Indonesia. The rapid growth of fresh produce consumption, exports, production, and distribution has resulted in pressure in the supply chain. However, the supply chain of fresh produce has benefited from new investments in the means and transportation facilities by the Indonesian Government.

Other constraints of small land ownership by farmers increased the cost of coordination for the combined Farmer Group (Gabungan Kelompok Tani/Gapoktan) and supermarkets, and resulted in difficulties in obtaining the desired amount of fresh and quality vegetables and fruits. Gapoktan/farmer and supermarket strive to complete the small production scale by establishing a relatively large crop production base through the consolidation of small land into more practical agricultural production units. Before the introduction. Some intermediaries are required between farmers and consumers to collect and transport production results from production locations to markets. The channel accommodates the collaboration of several supply chains in a supply chain organization. According to Thapaliya (2006), such variations can provide fertile land to learn why information exchanges occur by the requirements in some chains and why not elsewhere, why the level of coordination is high in some chains and less on the other, and how information exchange and coordination is associated with collaborative members. Despite the existing problems, the research of Thapaliya, (2006), in the case of Nepal, overall production issues increased rapidly, such as increasing competition due to increased production, and fluctuations in demand and bidding, encouraging perpetrators to strengthen planning collaborations in chains. However, due to variations in the structure of information chains, namely on the arrangement and dissemination of information along the chain, the transition in agriculture from subsystem to commercial, and the emergence of several fresh produce chains, different coordination rates are becoming an observation on this research.

## 2.3. Influence factors in collaborative performance

The discussion referring to the previous review of level planning collaboration of influencing factors in CPS, from concept and practice, through various forms of information exchange the success of the collaborative supply chain tends to depend on the characteristics of the information exchanged like quality (Malhotra et al., 2005). It is intended to explore factors influencing the development and implementation of CPS.

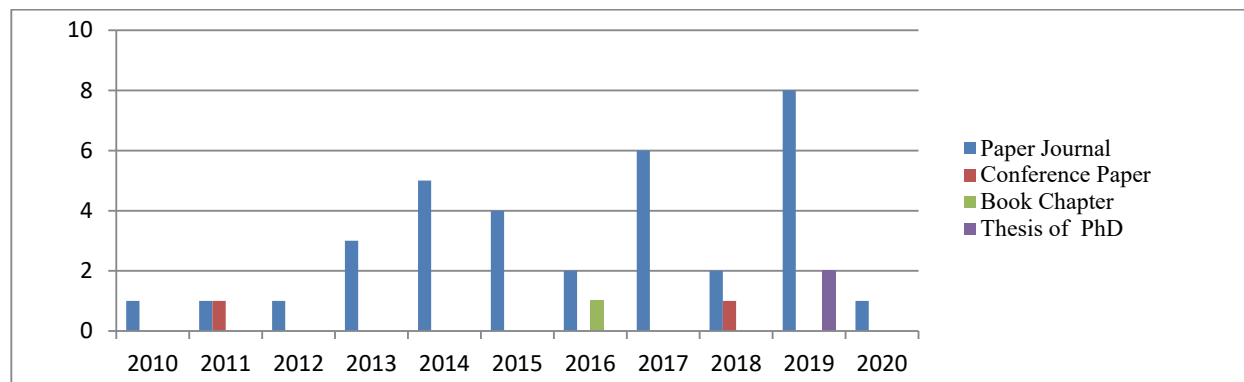


Fig 1. Research Charts of the Last 10 Years Latest

According to Forslund (2007), only a small number of studies measure the influence of quality information on the process of performance of the company in operations management. While, other influences in the fresh produce sector can be grouped based on influencing and results and country factors in previous studies as of table 1. (attached). The previous research from 2010 to 2020 years is described in Fig. 1. research charts by year and paper types on fresh produce. As for the success of the influence factors for these collaboration supply chain is shown in table 1 (appendix 1), was construction used in the literature of this review.

### 3. Research method

The study used systematic review for papers published in paper of journals, conference papers, working paper, and thesis of Ph.D. from Scopus database and search engine Google Scholar, ISI, and professional opinion in the field, from 2010 to 2020. The uses a combination of different keywords such as "Supply chain collaboration" or "supply Chain", "information structure" and "influence factors". A keyword like and "farmer" and "fresh produce" is used to find each related article in this field. Based on this combination of keywords, 189 articles from various journals and publications were found. With the keywords such as "farmer" and fresh produce in the database. A deep content analysis article is done, based on the full article title, abstract analysis and papers, 96 of 189 are selected on the second step. The third step, 39 of 96 articles were selected as topics of importance focused on fresh produce areas designated to categorize and analyze. The theoretical framework was constructs of developed by incorporating the principles of network supply chain collaboration, and the factors influencing collaboration with a look at the interests of business strategies and network theory between organizations, to reinforce the evidence of a relationship between the level of planning collaboration in deliverable information flow, both at strategic, tactical and operational levels in the supply chain.

### 4. Discussion

The concept of collaboration is the driving force in the management of effective supply chains and as core capabilities (Gichuru et al., 2015). According to Stevenson, (2014), supply chain management concept is the strategic coordination of the supply chain to integrate supply and demand management. Meanwhile, Heizer (2015) suggests that supply chains involve all interactions between suppliers, manufacturers, distributors, and consumers. While the success of the collaboration on the integration of supply chain members is influenced by the factors influencing of CP. Organizations of Collaborative supply chains that already implement of CP usually have a factor that allows it to do so, where as companies that do not implement, it may have obstacles that prevent it from doing so. These factors need to be investigated, so more companies can adopt CP. Factors influencing CP levels are identified through library review in the areas of performance management and supply chain collaboration. These discussions include the following; The Level of structure on factors influencing the performance of collaboration is the main construction of the study. This illustrates the level of collaboration between chain actors in managing joint performance. According to Simatupang and Sridharan (2008), these influence factors are due to the knowledge of the benefits of this collaboration characterized by implementing CP by combining it with some performance management activities in the supply chain such as planning, actuating, and evaluation of performance and target metrics. Therefore, CP is measured from these three dimensions: joint performance planning, actuating, and evaluation. The knowledge of the benefits of performance systems is the extent to which the chain actors understand that having a performance system will make a profit for his own company. Bourne (2001), stated that performance systems can be implemented effectively if the user's company understands its benefits. McAdam, (2000) states that small companies often do not understand that having a performance system is beneficial to their business. There is a need for supply chain managers to understand the benefits of collaboration as well as those benefits' relationship to performance (Blair, 2019). In line with Simatupang and Sridaran, (2008), research of Derrouiche et al., (2011), explains the benefits factors of collaboration on systematic behavior to predict future collaborative performance and recognize the latent problems in their relationship proposing an integrated framework between the business to business (B2B), supply chain and B2B to the Supply Chain (B2B-SC) and evaluation system performance. The framework is based on engineering data mining, enabling the development of a collaborative performance evolution model and decision-making that has forward-looking collaborative capabilities. Handayati et al, (2015) highlighted the importance of a good holistic understanding of the supply chain coordination between its suppliers and buyers. Meanwhile, Najmi et.al, (2013), examined the benefits of collaboration in terms of approach, technique and SC performance criteria with a strategic evaluation review of the company's relationship with its consumers.

A study of Derrouiche's proposed approach combines SD for modeling and measuring supply chain performance with ARIMA to analyze and project its stability over time. In addition, some of the uncertainty factors from the SC environment in the initial step were made as a prediction of a collaborative performance evaluation model performed using the Fuzzy MCDA. While, Mutonyi and Gyau, (2013), provided a proposed conceptual model of various methods proposed in its benefits at the operational level, on marketing and supply chain management systems to measure supply chain performance such as Activity-Based Costing (ABC), Balanced Scorecard, Economic Value Added (EVA), Multi-criterion Analysis (MCA), Life Cycle Analysis (LCA), Data envelopment analysis (DEA) and Supply Chain Council (SCOR models). The purpose of his studies, analyzing deviations from the optimal profile of supply chain collaboration and its adverse effects on sustainability as well as operational market performance. There is a lack of consensus on what determines the performance of a supply chain that complicates the selection of a measurement system in the agricultural food chain. This is strengthened research, a conceptual framework for performance measurements influenced by market benefits in its supply chain collaboration (Blome et al., 2014). Study of Taticchi et al. (2014), concluded proof of benefit i.e., the need for an

integrated performance framework with a new generation decision support tool that combines a triple bottom line (TBL) approach for managing sustainable supply chains. Using a mixed method to thoroughly analyze and investigate the ongoing aspects of the product life cycle throughout the supply chain, through empirical evidence, built theory and/or practice testing.

The research of Singh et al. (2014) applied more specifically to measure the impact of the vertical coordinated supply chain on the vegetable industry, the demand-bidding gaps, and price gaps for vegetables, which have been acquired from experts with the Delphi method. The main purpose of his studies is to measure the impact of vertical coordination related to the vegetable supply chain industry. The results of his research expressed the benefits of collaboration in strengthening the efficiency of the vegetable supply chain with a vertical coordination approach, with risk allocation and management through contractual relationships along the supply chain. The study of Gichuru et al. (2015), which aims to investigate the practice of collaborative supply chains in the performance of Del Monte Kenya Ltd., by adopting a descriptive case study design technique, the target population for this study was 243 staff members. Sampling techniques performed randomly stratification were used to select 73 participants from the sample list. By using a questionnaire to collect information from respondents, the data was analyzed using quantitative and qualitative techniques (mixed methods). The study of Ghicuru, et al. (2015), found that sharing information and sharing resources had a positive influence on the company's performance, stating companies should share resources with key suppliers to enhance their collaboration capabilities. According to the results of this Gichuru study, justified by Rodrigues et al. (2015), there is a benefit of collaboration in increasing chances of success thorough considering the potential problems involved, such as seeking supply chain partner support, ensuring access to information/data security and assessing whether a horizontal logistics collaboration (HLC) model which can bring improvements to various supply chain metrics, rather than reduction of distribution costs alone, this understanding was taken before deciding to continue the initiative of such a supply chain and logistics literature that tends to concentrate on supporting factors and conceptual models for horizontal collaboration (Daugherty, 2011). Advanced study proposals can be executed to obtain depth in all necessary elements in the implementation of the HLC project. By contributing a series of case studies from several industry sectors, we may determine the key success factors of HLC and the main challenges faced during the implementation phase of these cases. Further explaining the importance of the benefits of collaboration should be emphasized on the Partnership trust relationship and social relations in the research of Aharonovitz et al. (2018) aimed at evaluating the influence of logistical collaborations, meetings, relationship history, and supplier selection in the logistics performance of shippers, operators, and logistics service providers. Their focus on collaboration and performance was by investigating the interaction between construction and data survey data against 199 managers of the Brazilian company in the retail sector. The research provided a theoretical understanding of meeting effects, relationship history, supplier selection, and logistics collaboration on logistics performance by taking into account the opinions of shippers, carriers, and LSPS in the Brazilian retail sector. By using quantitative methods, they proposed collaboration factors with structural equation (SEM) models and concluded the importance of communication from meetings and operational features, interpersonal skills, organizational culture, while the history of the relationship leads to better performance. The difference in viewpoint for any type of company can demonstrate how companies implement and enhance their collaborative partnerships and help managers make better decisions about outsourcing logistics operations. But the research did not see the impact of the history of collaborative relations can be further researched to assess the influence of organizational culture on logistics and performance collaboration by measuring the influence of social behavior on historical relationships, since the operators, shippers, and LSPS have different strategies and operations, and this can be used for further development of studies by using an expanded sample to build one SEM of each company.

Meanwhile, the benefits of collaboration factors based on research by Holmström et al. (2016) wa to consider the link between a collaborative supply chain framework configuration with supplier manufacturing processes and inventory control performance. Here there was a significant gap in the literature, many of the most important contributions to the visibility of the supply chain only assume that all downstream data is always shared. The absorption suggests that retail data can be used to align forecasts in the supply chain (Lee & Wang, 1997), by referencing that, information is always available from all retailers and their shortcomings in the practice in the field, not discussing how this should be done if some data is lost, to benefit from collaboration. From this, supplier responsibilities need to be well integrated into several different managed supply chain configurations/suppliers. Unfortunately, such indicators; increased inventory reviews, and frequency trigger fill-information requests available through vendor managed inventory (VMI) are not used in the core model, i.e., there is no production planning or inventory control solution that will capitalize on sales information-through customer presentation-VMI. The assumption used is that comparable data is always available from all customers because the supplier can change the configuration of supply chains to all its customers.

The study accomplished by Sangwan (2017), aims to develop various activities, variable decisions, and performance indicators based on four basic activities under reverse logistics. By revealing, three basic questions, who will collect from the customer, what to do on the product being collected, and where to send it. The location and capacity of various centers, network types, various recovery options, various collection methods, and seamless integration with advanced logistics are the main decision variables. The case, explaining the main activities, the decision variables involved in each of the activities, and key performance indicators needed to make the decision. Researchers in previous RL fields haven't thought of KPIs along the line of activity. The unavailability of KPIs and variable decisions influence the direction of research in the region and also the justification of RL activities for peak leadership in the organization. As a result, with the identified KPIs, managers can make effective decisions in the design of reverse logistics activities. Therefore, more research is needed to

improve KPIs for different types of industry segments due to the volume of collection and the importance of collection depending on the product type. Another context added, factors that influence collaboration such as benefits, trust partnerships, and market communication, are used in research Septiana et al. (2015), which is conducted in the center of Onions in Brebes Indonesia. Members of the shallot supply chain network are farmers, merchants, wholesalers, retailers, or traditional local market traders. Performance measurements for this onion supply chain show the highest value during the season and in the holiday season. Efforts to improve the performance of the shallot supply chain in Brebes include establishing the right inventory system; building partnerships, coordination, and collaboration among Farmer's chain members and institutional capacity development overcoming the low availability of shallots especially during the holiday season; improving market information availability, and resolving issues related to distribution mechanisms. In line with research of Yu et al. (2018), using benefits factors, sustainability in innovative product industry collaborations, further emphasize that the flexibility of proactive supply chains can play a more important role than the flexibility of reactive supply chains concerning the integration of supply chain information and operational performance. The research suggests that the integration of internal and external information contributes to the flexibility of reactive and proactive supply chains, which is gaining high operational performance by using secondary data from food companies registered in China, by testing the antecedent and the consequences of the two-dimensional supply chain flexibility. It uses samples from 84 food companies that have been listed for three years in China and content analysis based on their annual report. The results concluded clarifications of the definition of supply chain flexibility and divided this concept into two dimensions: reactive flexibility (adaptive capability), and enterprise proactive flexibility (dynamic capability). Also explained, supply chain flexibility is crucial for companies to respond to uncertain circumstances caused by environmental factors, such as diversity in customer demand, product security issues, and industry policy adjustments. Thus, allowing for future studies can adopt a larger sample to test the indirect effects of integration against operational performance through the flexibility of the supply chain.

While, Hoa et al. (2020), discuss of qualitative illustrations of the causal relationship among factors that influence the building of the logistics center, with the SD model methodology and the results stated that Logistic Center is built and can contribute significantly to the reduction of various costs, boost completeness, make the most of the capability of user enterprises, and create better connection and value for outsourcing service providers. Further research is encouraged to take into consideration the quantitative attribute of causality among factors. The benefits of collaboration, partnership, and social relations trust are also used in the research of Makalew et al. (2019). The purpose of this research was to see the influence of supply chain management on competitive advantage in PT. Mitra Kencana distributes Indo. The sampling method used purposive sampling, which was the determination of the samples assessed according to the research purpose. The data analysis method used was double linear regression analysis. Partial testing results showed that strategic supplier partnerships and customer social relationships had significant influence on competitive advantage, but the level of information sharing and quality of information sharing had no significant effect on competitive advantage. Simultaneous testing also showed that strategic supplier partnerships, customer relations, information sharing levels, and quality of information sharing together had significant influence on competitive advantage and benefits for the company. Further study can be done for the company to further improve the exchange of existing information so that the smoothness in operation is increased and can maintain good relations with suppliers and consumers so that the company can build longer cooperation and excel in existing business competition. In the study of Makalew et al. (2019), there is in line results with Damang et al. (2019) and Their study aim was to test the influence of supply chain strategy consisting of quality strategy, flexibility strategy, responsive strategy, efficiency strategy on the competitiveness of the passion fruit industry business in South Sulawesi. The method of analysis used was SEM and the result found that all factors in the supply chain strategy had a significant influence on the competitiveness of business except responsive strategy; Quality strategies had a significant influence on business competitiveness. Product quality is one of the important factors to increase the competitiveness of the company's business and the flexibility strategy has a significant influence on the competitiveness of a business. Therefore, the flexibility strategy should be adopted by the Passion company to get the best business competitiveness. Meanwhile, efficiency strategies have a significant influence on business competitiveness. Managing business operations in an efficient manner is crucial for the company in achieving better business competitiveness. In fact, responsive strategies have no significant effect on business competitiveness. The results of this study provide enough information and data for the managers of the fruit industry in South Sulawesi, the importance of formulating the right strategy in enhancing their business competitiveness. In addition, some further improvements are mainly on responsive strategy indicators by enterprise managers.

Setiawan et al. (2011) used a supported system approach with performance measurements involving the performance of farmers on the commodity of lettuce. The exponential comparison method (MPE) to select commodity priorities, the combination of the SCOR and fuzzy techniques of AHP is used to design performance measurement metrics, data envelopment analysis (DEA) for individual performance measurements of supply chain members and strength-weakness-opportunities-threat (SWOT) analysis were formulated to formulate strategies to improve supply chain performance. The commodity yield supply chain of lettuce performance with the DEA technique suggests that the farmer's performance has quite a high efficiency, although it has not reached 100%. More research needs to be developed to design high-vegetable supply chain management integrated with performance measuring systems with a collaborative system approach, needing to develop further research on performance measuring systems that are integrated with early detection systems in high vegetable supply chain management. There is a gap in this study. Study of Pekkola and Ukko, (2013), is the mine cleaner practiced in the determination of the character as a qualitative single case study. Empirical Data is collected in a collaborative network in Finland, consisting of a reputable company and a reseller network. This work is based on five

research articles implementing various research methods. Research questions are examined at the network level and in one-level network partners. This study examines the process of developing and using performance measurement systems that support performance management in collaborative networks. This Model is a practical tool that helps analyze the level of collaborative network performance management and to further develop. This study enhances the understanding of how to manage performance in collaborative networks and the use of such performance information that Domain Keys can identify in a collaborative network.

Skipworth et al. (2015) used different factors influencing performance collaboration; aversion to change the performance of the organization's collaboration by looking at alignment, partnerships as a factor affecting the laboratory between SC organizations. Skipworth's research objectives to explain how supply chain alignment, which remains a major challenge for the supply chain and can be achieved and engaged in business performance (BP) by testing the strength of the relationship between previously identified enablers, supply chain alignment, and BP. Case-based approaches will allow for greater understanding of the construction and relationship between the two, so the increase in BP theory. Hernández et al. (2015) performed an investigation on fresh commodity value chains producing tomatoes in Indonesia. Farmers in this channel, which sell to modern wholesalers, shared some properties with farmers in modern channels, which sell directly/indirectly to supermarkets: Both groups used high-level irrigation; Increase their land area under tomato time, and are sensitive to the price of inputs, implying commercial orientation. However, the results show that virtually no farmer in every channel selling tomatoes was assessed; In the early stages of modernizing the market in Indonesia, the main 'rental arrest' was awarded to the wholesale specialty for supermarkets and wholesale modernization. Essentially, non-land assets – mainly irrigation, are important for farmers participating in supermarkets, or modern channels, but the size of the farm only affects the participation of modern channels at high levels of commercial zones (solid zones in infrastructure and near highways). Conversely, farmers in central and traditional channels use more labor and fertilizer than efficient allocation but yet have higher results than farmers in modern channels.

Findings in the study of Hernades et al. (2015), also found that modern channels of farmers benefit more from farmers on other channels but do not need to use more intensive chemicals. In the study of Aggarwal and Srivastava, (2016), in his research carried out at the downstream of the supply chain, where the company's collaborative relationship with the Distributor or its reseller can be learned to identify how the collaboration impacts the upstream supply chain and whether it is different or not by the one outlined, Its aim is to understand the process and role of supply chain collaboration in Indian agriculture-food industry and highlight buyers and suppliers ' perception of one another. The methodology is used in research conducted on leading Indian food processing companies, conducted to explore applications and the benefits of collaboration in the supply chain. While, for buyers, it's important to have a good relationship with the supplier, because they don't want to get into the complicated activities to find new suppliers for the main areas current and future. As a result, it shows that developing collaborative relationships not only generates benefits for buyers and suppliers but also leads to better and sustainable practices in the industry.

The desire changed as a factor that led to the collaboration according to Michalski, et al. (2014), stating the importance of trust in partners and technology. Michalski's research examines the non-linear aspect of the relationship between asymmetry and performance in the supply chain (SC), under the varying intensity of collaboration and integration. By offering a new useful approach to designing strategic elements of a supply chain management (SCM) relationship. Using a partial smallest quadratic method, an empirical study of 66 companies in Spain has been conducted to clarify contemporary relationships, suggesting new directions, and ultimately contributing to the development of SCM theory. Results and analysis get identification, such as; 1) The approach can be applied to different types of asymmetry to determine how they affect the performance that is important to which type of asymmetry is more important for developing resources and competencies, and which reduces the chances for company growth. 2) The natural extension of the study could be to empirically explore other important issues of the SCM process identified in the previous investigation. Further research can be done. In the future, the need for broad variation in relationships due to size, organizational structure, technology, strengths, and other factors, a specific study comparing SC partnerships along these dimensions, is valuable to understand the specific concerns of a complex SC relationship. The design of longitudinal research is necessary for future research to completely understand the effects of asymmetry, a causal relationship between asymmetry and performance, in addition to the influence of other contextual factors. Additional interactive effects between variables need to be incorporated into the research framework. Besides, the validity of our results may be limited to contexts similar to Spanish SC.

Conversely, Tsanos et al. (2014), argue that, at the measurement of collaborative performance, unchangeable reluctance, often regarded as a bureaucratic burden causing system complexity. Reluctance to change can be understood as a business person's reluctance to change its habits or cultures because it is comfortable with the current system. Their research, aimed at them; 1) Reviewing the literature on the topic of antecedent collaboration behavior and its impact on the integration and performance of supply chains; 2) laid out the theoretical basis and developed a conceptual model that links the antecedents of collaborative behavior, information integration, operational decision coordination, and supply chain performance; and 3) set the operationalization considerations. The theory is used and the existing supply chain theory is developed as a causal model that can be operationalized using a structural equation (partial least square) and approach to "single key informant" through operational decision coordination.

The empirical validation result of the model should provide a more accurate conclusion on the relationship between behavioral factors, supply chain integration, and performance. This paper establishes a causal relationship between

construction which does not justify the development of knowledge that will help decision making in SCM/logistics and integration into models, processes, and tasks. Once the hypothesis is validated, road maps need to be developed in

subsequent studies, reflecting how the occurrence of antecedent behavior in the relationship between supply chain partners can affect integration across the supply chain and consequently lead to higher supply chain performance. Successful collaboration in the supply chain requires businesses to change their management from individual management of the company to integrated processes in integrated supply chain activities (Stevenson, 2014; Cooper et al., 1997). While the next factor also affects collaboration, especially the readiness of collaborative culture, refers to the habit of working with partners in planning and implementing business initiatives (Simatupang & Sridharan, 2002). Trust is a dimension in the supply chain partnership that can improve the quality of relations between companies (Sodhi & Son, 2009). Trusting each other makes inter-company relationships easier by eliminating suspicion and vigilance and simplifying settings or procedures in inter-company relationships. Trust in the research by Sari et al. (2017) focuses on the partnership trust. The research aims to analyze the performance of vegetable supply chains and contract agricultural partnerships in companies in Indonesia. Based on the results of the research that has been done, it can be concluded that the results of supply chain performance show that, from the reliability only, the advantage position so that the supply chain performance of vegetables should be further improved. Data processing methods include analysis of supply chain operation reference (SCOR) and analysis of model of agriculture contracts with respondents of 20 partner farmers and company staff. Analysis of agricultural partnership contracts to support supply chain performance is a centralized model. The results of a suitable agricultural partnership contract analysis are set to support the performance of the supply chain is a centralized model (CM). The agricultural contact then helps the farmer in the provision of inputs and minimizes the risk of the price received by the farmer because the purchase price is determined at the beginning of the contract. Research on this Sari found a deficiency in his research as a follow-up to the next research, where the efforts of development of vegetable supply chain in the presence of farmers is with a relationship between farmers and companies by implementing a contract farming system between farmers and companies.

Research by Kumar et al. (2019), which aims to model and investigate the culture of collaboration and the role of relationship strength in the collaboration of supply chains. Positive results: This study highlighted the important role played by culture and the strength of relationships in collaboration. Drawing from a relational view, the conceptual model was developed with the help of literature, and the model is validated with data collected in India using quantitative methods with partial least squares. Furthermore, the success factor of collaboration is also influenced by not only needing technology and information, but the tendency for people to collaborate is more important. Research of Manos and Manikas, (2010), uses an adequate labeling technology method that allows efficient browsing of farms and cooperatives to be a milestone of chain integration, rapid production flow, and information transparency, the need to identify additional challenges, opportunities and barriers through case studies, where collaboration and information sharing are key components of business process management (Papakiranipoulous & Pramatar, 2010). The Manos and Manikas (2010) research also highlighted a very significant impact on the quality of the information in terms of timeliness, accuracy, relevance, and value-added to the sharing of information and collaborative performance. Qualitative data refers to the assessment of collaborative performance measures based on expert interviews, while quantitative data demonstrates the use of two performance measures in a collaborative supply chain network, the importance of adequate labeling technology that enables efficient browsing of farms and cooperatives is a milestone of chain integration, rapid production flow, and information transparency. Research samples include 22 agricultural cooperatives and personal packing houses located in northern Greece where core value-added activities of the fresh produce supply chain are underway. Adequate labeling technology that enables efficient browsing of farms and cooperatives is a milestone of chain integration, rapid production flow, and information transparency.

In study of Ageron, et al. (2013), more exploring, his research aims to test and evaluate the importance of SI/TI criteria in the supplier selection process. The data was collected from 90 French companies and then analyzed to understand the SI/TI criteria used for supplier selection along the upstream value chain. This is consistent with the fact that IT/IS has helped improve both externalization and internationalization dynamics, especially by solving the problem of geographic distances between network leaders and their suppliers and by encouraging the development of exchanges and upstream relationships. This paper discusses the IT/IS problem in the selection of suppliers and their importance compared to other traditional criteria in upstream supply chain design has investigated the Chinese companies, Kannan and Tan (2005) have studied the role of past and current relationships with suppliers in the company, by comparing the attitudes of USA and European managers (Humphreys et al., 2016). Thus, further research is advised to discuss the preferred arbitration criteria in the selection of these options, including the absence of influence of each criterion to develop and regulate the multi-criteria selection method.

Chang et al. (2013) discussed based on the nature of e-procurement technology, partner relationships, information sharing, and supply chain integration and proposed as three intermediary variables that have the potential to capture basic strategies applied through technological functions and also represented the reasons for e-procurement impacts on the supply chain. Based on the results of standardized effects analysis, supply chain integration is the most important factor that gets the effect of e-procurement to supply chain management, implying that supply chain integration is the main reason for explaining the processes in which e-procurement contributions contribute to supply chain performance. They found that partner relationships, information sharing, and supply chain integration could represent the process through which the procurement



contributes to the supply chain performance. Compared to partner relationships and information sharing, supply chain integration has more influence on the performance supply chain.

Sustainability and technology at study of Graça et al. (2016), as a contributing factor to collaboration, were discussed in the business ecosystem and made it possible by the increasing use and improvement of communication networks. They currently offer a strong competitive advantage for businesses and entrepreneurs by proposing a series of indicators to assess the benefits of collaboration. The work in the future aims to find answers to answer the second research question, consisting of “How to promote collaborative sustainability and resilience in the business ecosystem?”. To answer this question, the following hypothesis is considered: “Sustainability and the resilience of collaboration within the business ecosystem can be promoted if the incentive system, combined with a transparent assessment method, is applied at the ecosystem level”. The study proposes a set of performance indicators to measure some of the benefits of this collaboration, therefore motivating the sustainability and resilience of the business ecosystem. The purpose of this system dynamics implementation (SD) was the stage for capturing and representing the CBE organization, which is regarded as a complex system along with stock and flow structures, feedback processes, time delays, and other structures, which define dynamic behaviors. The hypothesis is largely supported by models using SD combined with an agent-based simulation (AB).

While, information technology became a focus factor in research Nakandala et al. (2017), more than generic FFSC is more applicable to the food farming sector, the application of the proposed current model of information and matrix information can be extended as a guide for the analysis of meat, poultry, and fish products SCs to identify key actors and their specific information needs. They also added that with a stationary request, the value of sharing information is more marked when there are fewer subscribers, with a greater proportion of all customers involved in sharing information, and larger batch size orders. The literature analysis emphasizes the identification of various participant entities from the FFSC Information network and their specific information needs. For example, based on their simulated studies, the sharing of stock-in-hand data is valuable when a stationary request is placed while sharing customer information and planned order information is valuable when a non-stationary request is made. However, there are things that have not been addressed in this study, so further research should empirically evaluate, analyze and validate the specific information needs of the FFSC entities and mechanisms available to allow the interaction of such information-sharing including the role of information technology as an enabler to facilitate the integration of information among FFSC entities.

The study conducted Zhong et al. (2017) aims to review the management of food supply chains (FSCM) in terms of systems and implementation of FSCM. A systematic and hierarchical framework is proposed in this paper to review the literature. Categorization and classification are identified to govern this paper. As awareness increases about the quality, safety, and freshness of food, FSCM faces pressure to meet these requirements. Current challenges and future perspectives of supply chain network structures, data collection, decision-making models, and implementations are highlighted. Zhong's research results, giving an important idea for academics and industry practitioners: advanced technologies such as Big Data Analytics, Cloud Computing, and IoT will be used to transform and enhance FSCM into a smart future; Data-driven decision making for FSCM will be adopted to achieve a more sustainable and adaptive food supply chain, and implementation of FSCM will be facilitated by leading technology solutions that enable with more hospitality and user customization. In line with Zhong et al. (2016), the study of Aleruchi, (2019) is a thread to explore strategies that supply chain managers use in retail wholesale businesses to minimize the loss of easily damaged foods. Data was gathered from semi-structured interviews with 6 Pennsylvania retail wholesale supply chain managers who implemented strategies to minimize the loss of easily damaged foods and from organizational documents. Data analysis is done using the Yin 5-step process in composing, unpacking, reinstalling, interpreting, and summing up the data. The three themes that emerge as a result of data analysis are inventory strategies, logistics, and shipping strategies, and information technology strategies. The results of the research are that supply chain managers use inventory strategies to manage perishable management procedures, logistics strategies to manage supply chain procedures, and IT strategies to manage the flow of information and collaboration among supply chain partners. Supply chain managers in the retail wholesale industry participating in the study used inventory strategies, logistics operational strategies, and IT strategies to minimize perishable food loss. Supply Chain managers use FIFO inventory methods, product rotation, automatic recharge, multiple daily deliveries, cooling, and information sharing between distributors, suppliers, and buyers.

Technology and the desire to change and culture of collaboration are covered in factors affecting the successful collaboration of research (Cappellesso & Thomé, 2019). The study aimed at synthesizing and exploring collaborative interactions, systematically reviewing the literature on innovations and food supply chains, with a systematic review of technological innovations and food supply chains conducted under the Ordination Method protocol. The method is used to select and rank papers according to their scientific relevance. On the other hand, the study seeks to analyze innovation as an object in the food supply chain, highlighting aspects that affect innovation, while creating new aspects. It is also important to consider the creation of value when studying innovation in the supply chain. Regarding the stage of the innovation process, there are research works that are largely focused on the generation of innovation. However, what has not been discussed in the research of Cappellesso and Thome, (2019), can be considered as a further study. In addition, as directed by the supply chain, attention innovations should also be given to the creation of value (Lambert & Cooper, 2000), and to see how useful the value of creating a joint CPS at the FPSC can be evaluated by all collaborating partners (Susanto et al., 2020).

Markovski et al. (2019) performed an investigation on collaborative factor; Social relations and technology in the discussion of economic transaction costs (TCE) and social exchange theory (SET). They explained why and how the external environment, governance structures, and interpersonal relationships affect information and communication technology (ICT) sharing information that is enabled in the supply chain (SC) of small and medium enterprises (SMEs) of the developing world. The authors adopted a theoretical development approach using a double case study design, including four SMEs operating in the SC from two developing countries, where they conducted case studies in and cross-case analysis. On the other hand, managers who do not trust in supplier Integrity, virtue, and competence lead to the application of strict control mechanisms, engaging in disputes and avoiding business transactions, which moderates the relationship between information sharing and information sharing made possible by ICT. By developing a comprehensive theoretical model, explaining how and why interdependence between external environments, governance structures, and interpersonal mechanisms affect the sharing of information made possible by the ICT of SMEs operating in SC from developing countries. Thus, future research is necessary to examine the sharing of information between organizations in developing countries as well as countries with a more advanced economy.

The study of Bahinipati (2014) emphasizes technological and sustainability factors in supply chain planning for fresh produce relating to short life cycle products in competitive markets, integrating farmer complex networks, food processing, and supply to increase consumer end of operational effectiveness. This planning framework collects data from a variety of sources, such as customers, supermarkets, farmer cooperatives, and farmer contracts. This framework is to provide visibility into the status of requested requests for inter-company collaboration. With a supply chain analysis that considers business planning aspects, supply and demand management, inventory, transportation, logistics optimization from the information-sharing perspective to satisfy the needs of end customers, the research has assessed the importance of sustainability factors changes in the management of ICT's procurement and infrastructure activities and supports e-market service modes, as well as establishing a collaborative control framework, which can provide insight to the industrial food production manager. Social relationships influence the supply chain's business practices. As evidenced by Lu et al. (2008), social relations can positively influence collaboration by increasing trust among supply chain actors. The technology in the framework refers to the hardware and software used to support the coordination between the member chains (Fawcett et al., 2008). Sutdueana et al. (2019) intended to examine the relationship between supply chain integration and collaboration, market communication, and supply chain performance. Additionally, they examined the moderation role of market communication in the relationship between supply chain integration and supply chain performance. Researchers claimed that if there is more integration in supply chain management, the performance of supply chain management will increase as well. There is an argument that there is an opportunity for marketers to participate in this relationship; the planning and process allow input to adopt a realistic approach rather than a theoretical approach. This study, which is one of the pioneering studies on this issue, will help policymakers and managers in understanding the role of marketing theory in supply chain management. The discussed study concluded a positive relationship between supply chain integration, market communication, and supply chain performance. While, the social connection was also placed on the research of Lau et al. (2017), as a factor that affects the success of the collaboration, in addition to food safety factors. The purpose of the research was to develop a business process decision model to assess non-compensated food safety sub-criteria to disqualify fresh food suppliers that cannot reach the minimum threshold for possible low food safety failures. Although food safety is one of the weakest chains in the fresh food supply chain and affects consumer food choices differently than quality dimensions, this factor is hardly proposed as one of the major traditional supplier selection criteria (e.g., quality, shipping, and pricing) in literature. The study proposes a new approach that combines several multi-criteria decision-making techniques (MCDM), including the AHP Fuzzy (FAHP), TOPSIS, and ELECTRE, and is innovatively applicable to analyze supplier performance and prioritize potential fresh food suppliers. ELECTRE is a non-compensatory MCDM method, therefore, this is especially true for the disqualification of high-risk fresh food suppliers from the performance evaluation of full-scale suppliers, further by FAHP and TOPSIS. The study of Vetter et al. (2019), aims to identify and discuss two areas that have so far been ignored by research and policy-making and that require further investigation: (1) Simultaneous transformation in traditional food value chains and their relationships with modern markets, and (2) the social and environmental performances of modern vis-à-vis the value chain of traditional foods. Based on the field research conducted on the horticultural value chain in West Java and South Sulawesi, this paper explored this phenomenon and joint efforts undertaken by governments and corporate actors regarding the value chain intervention of food agribusiness and market modernization in Indonesia. The result is that after more than 15 years 'supermarket revolution' in Indonesia, traditional food retailing does not seem to be completely dead, but more adaptive and resilient to its modern competitors. Similar warnings apply to the concept of improvement and how it has been translated into development practice: Despite being an instrument to understand the transformation of the value chain and to act on it, a narrow concept associated with the company's level competitiveness and the potential impact of poverty at the household level is ignored. The broader structural questions and thus do not have an analytical boost in enhancing the knowledge and prospects of our development in relation to broader inequality and sustainability issues. The direction of the research into more traditional markets seems to be more constructive than continuing with excessive emphasis on development interventions based on a mono-directional development thought, depending on the pathway, which only risks the loss of development and other potentials. The trajectory may be more inclusive and sustainable.

In line with this, the research by Kumar and Goswami (2019), argues that the conceptualization of sustainable performance as a unity of size or construction should eventually motivate researchers to understand the influence of innovation, culture, ability, collaboration, commitment, etc., on this cohesive construction to excavate the holistic picture, rather than simply

studying the effects on three separate aspects. The study found building the most exciting social capital in achieving sustainability in India compared to the advanced economy in which environmental issues were given priority. That discussion in addressing environmental issues damaging the social dimension despite its potential to bring incredible results by gaining loyalty and customer commitment (Mathiyazhagan et al, 2013; Nishant et al., 2016; Harms et al., 2013). The purpose of study accomplished by Kumar and Goswami (2019) was to conceptualize the SSC performance as a two-dimensional formative construction of a three-dimensionally caused by the first three-order reflective construction by structuring supply chain sustainability and underlying activity, validating it empirically and placing it in a different perspective of practice (Albort-Morant et al., 2016; Beske & Seuring, 2014; Mariadoss et al., 2016; Nishant et al., 2016; Varsei et al., 2014). While, collaborative and environmentally friendly consciousness, namely; Strong reasons are proposed to build a greener business for the future since the changes caused by the industry today have created the EBD for the human being itself (Nulkar, 2014). The study of Nulkar (2014) argue that in SME's, companies should respond to the environmental challenges facing the world so there is no more isolation. Environmentally friendly practices do not necessarily create burdens for the industry by taking the focus on traditional strategies to lead to the practice of green Strategy which reduces waste and increases business outcomes now. The simple way of existing products proved beneficial in improving operational efficiency. In this case, it demonstrates the need to start with the increasing knowledge and environmental awareness of the industry owner for sustainability on this earth.

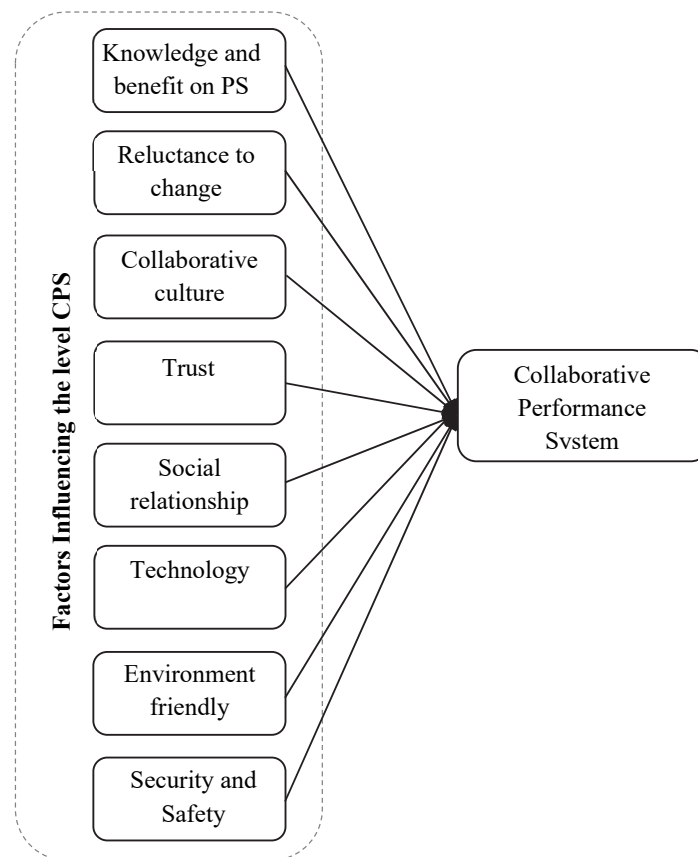
Research by Gardas et al. (2018) note other problems with food security is one of the critical global challenges. There is a need for governments and industries to begin to understand the importance of implementing green supply chain management (GSCM) in their supply chains. There are various drivers and performance indicators. The study aimed to analyze the 14 PI using an interpretive structural modeling approach (ISM). In this study, the PI of GSCM was identified through literature surveys and the opinions of field experts. The results showed that three PIs, namely, environmental management (PI 1), Regulatory pressure (PI 3), and competitive pressure (PI 2) were significant compared to the other 11 PI examined for transitivity and transitive links. The accuracy and reliability of the model can be improved using an integrated approach, namely with the ISM methodology of other MCDM tools such as the analytic hierarchy process, the analytical network process, the interpretive rating process, the total ISM modeling, and the fuzzy set can be used (Gardas et al., 2018; Jha et al., 2018; Mishra et al., 2018; Raut et al., 2018; Narkhede, et al, 2017; Sasananan et al., 2016). The results of the research also helped in formulating policies and strategies to achieve food security, environmental resource conservation, and to improve the financial performance of the industry. In addition, managers of the food and agribusiness industry can respond in a better way to changing consumer demands by enhancing the sustainability of processes and products. Unlike the research of Wilson et al. (2019), more sustainability towards sociological resistance, revealed the analysis of the concept of resilience in supply chain management studies focuses largely on the downstream side of the value chain and silently assumes an unlimited supply of raw materials. This assumption does not make sense to the agricultural value chain, because a clear upstream disorder has a material impact on the availability of raw materials and is a common source of supply problems. The study aims to present a framework for the operationalization of the concept of socioecological resilience in the agricultural value chain that combines upstream activities, with network analysis to review articles. The conceptual framework was then developed to identify the durability elements and indicators relevant to the tropical farming value chain. As a result, when the agricultural value chain is viewed as a socioecological system and an endurance analysis focused on the upstream, the chain actors whose main activities determine the system's endurance state are the main actors. Therefore, the conceptualization of the resistance of the agricultural value chain should reflect the context of the analysis and socioecological interactions affecting the system's durability conditions. The sustainability analysis in the upstream-focused agricultural value chain highlights the relevance of socio-ecological interactions in determining system endurance conditions. Apart from these limitations, this conceptual framework provides a strong foundation for future studies on supply chain resilience in the agricultural value chain. Future studies need to be examined to analyze resilience in the agricultural value chain at the individual economic unit level and should focus on upstream, extending to raw material producers, such as frameworks on elements that capture the response to short-term changes in the fresh agricultural value chain as a device.

Research of Jiao, et al. (2012), noted that the quality and safety of the product has been a major constraint for further development of the Chinese table wine industry, which is dominated by small-scale vinegrowers. Table wine is one of the most important horticultural crops in China. The results have also revealed that both models of agribusiness-led and supply chain models are led cooperatives more efficiently than traditional in quality control and safety and enhancement of farmers' performance. Results revealed that both models of agribusiness-led and supply chain models led cooperatives more efficiently than traditional in quality control and safety and enhancement of farmers' performance. As the focal point of two modern supply chain models, agribusiness and cooperatives play an important role in enhancing the effects of control and performance. As the focal point of two modern supply chain models, agribusiness and cooperatives play an important role in enhancing the effects of control and performance. As far as model-led cooperatives are concerned, Governments should offer preferential policies relating to taxation, credit, and lending to agricultural cooperatives.

Study of Weber, (2019), which aims to explore the strategies employed by several and beverage industry leaders in the United States to implement sustainable water consumption practices to improve operational efficiencies. Using the conceptual framework of stakeholder theory, and the primary data source is a semi-structured interview on 4 food and beverage industry leaders in Wisconsin who have a responsibility to implement their company's sustainability practices, and secondary data sources are the company's sustainability reports. Thematic analysis is used to analyze data, which results

in 4 themes: efficient equipment, stakeholder focus and sustainability, water recycling, and supply chain support. Many companies transfer the production process of raw materials to their supply chains to reduce the burden of being directly involved with high water consumption practices, enabling the company to operate in freedom to assist supply chain members in efforts to reduce water consumption and improve operational efficiencies. The key to solving many problems is owning or installing efficient equipment, recycling water, supporting and managing the supply chain, and maintaining a combined focus on stakeholder needs and sustainable business practices that develop and promote operational efficiencies. Tecco et al. (2016) emphasized sustainability factors, environmental impacts, and trust for the success of supply chain. Research, aimed at how effective consumers are by using multidimensional and complex concepts as product sustainability, how to make sustainability attributes a factor considered in the final purchase options, and how involving various stakeholders in buildings from the sustainable supply chain is still a topic of open discussion. The strategies undertaken as part of the transition to different production models for farming are considered: Rotate different plants each season and consist of forest areas, grassland, making it a natural holder of 'green Credit' which aims to reduce carbon dioxide generated in the production cycle. This approach, adopting a new mechanism for coordination among stakeholders, with appropriate forms of control such as code of conduct industry in line with van-Hille et al. (2020), collaborative practices such as participatory certification systems aimed at building trust, cross-sectoral assessments, and analytical tools for the sector.

Based on the above discussion, this research, taking the construction model used, constructs a model factors influencing of collaboration in fresh produce supply chain (FPSC) as shown in Fig 2.



**Fig 2.** Construction Model Factors Influencing of Collaboration in FPSC

## 5. Conclusion

By providing the theoretical framework, and incorporating the principles of the Supply Chain Collaboration network theory, gained in previous literature is evident, regarding the factors that have taken the collaboration, including; Knowledge of the benefits of collaborative work systems, desire for change, collaborative culture, trust, technology and information, social relations, friendliness, sustainability security and safety. Discussion by looking at the interests of business strategy and network theory between organizations obtained evidence of a relationship between planning level collaboration in the information flow, both strategic level, operational and tactical, in the supply chain of fresh produce as a reference in the reference factors of influence the success of supply chain collaboration in the fresh produce.

Recent development of studies can be proposed, such as; the research further focuses on the cultural influence of organizations on the collaboration of supply chains and performance by measuring the influence factors of social behavior on historical relationships, as operators, shippers, and LSPS have different strategies and operations, samples can be expanded to build one SEM for each type of company. Further research can accompany the information to benefit from the

collaboration of how this should be done if some data is lost, for companies to further improve the exchange of existing information so that the smoothness in operation increases and can maintain good relations with suppliers and consumers so that the company can build longer cooperation and excel in existing business competition. More research is needed to fine-tune KPIs for different types of industry segments due to volume collection and the importance of collection depending on product type also future research can adopt larger samples to test the indirect effects of integration on operational performance through the flexibility of future research supply chains, how to measure performance integrated with early detection systems on supply chain management on fresh produce. This research can further to Mrnguji supply chain alignment theory by revealing that the SA and CA require different key enablers, which contradict the previous thinking, namely that they share the same enablers.

Future research is also on how to create a roadmap that reflects how the occurrence of antecedent behavior in the relationship between supply chain partners can affect integration across the supply chain and consequently lead to higher supply chain performance that can be developed. Research can also be done for the future, with the efforts of the development of supply chain fresh produce at the head of farmers is with a relationship between farmers and companies by implementing a contract farming system between farmers and companies. Further research is advised to discuss the preferred arbitration criteria in the selection of these options, including the absence of influence of each criterion to develop and regulate the multi-criteria selection method.

Further research, should empirically evaluate, analyze and validate the specific information needs of the FFSC entities and the mechanisms available to enable such information-sharing interactions including the role of information technology as an enabler to facilitate the integration of information among FFSC entities, including considering conducting quantitative correlational studies to test the relationship between variables, such as delivery time, number of product rotations, and easily damaged, quality of food, and customer satisfaction in the retail wholesale industry. Researchers in the future can be done by considering doing some case studies about minimizing the loss of easily damaged foods in other geographic areas to test the transfer capability of these research findings.

Further research also, the need to consider service innovations in the food supply chain and how they can add value to products and chains, such as; Research that seeks to understand the impact of innovation in the food supply chain has not been emphasized, taking into consideration their coordination and integration. Encouraging future research to examine the sharing of inter-organizational information in developing countries as well as economies in more advanced countries with the development approach of inductive theories to develop a set of propositions about information sharing between organizations in SMEs, and more focused on how social bonding influences trust and distrust in a willingness to share information with SC partners that are not recognized in a single collaboration supply chain.

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## Appendix 1

**Table 1**  
Factors influencing CPS of Supply Chain Fresh produce in previous literature

Author, Years	Objective	Factors influencing	Planning Structure	Methodology	Channel and structure Collaboration	Country
Manos and Manikas, (2010)	To identify the main factors affecting the implementation of traceability schemes, under the current supply chain structure and evaluate the theoretical framework DomainKeys identified in the literature.	Technology and information	Strategic	Qualitative	Wholesalers-retailers-consumers	Greek
Jiao et al. (2011)	To examine the impact of a supply chain model based on different strategic partnerships on the effect of safety and quality control and small-scale vinegrowers ' performance	Product Sustainability security and Safety	Strategic	Mix Method	Grower-Intermediate-Wholesalers-supermarket/trade market/retail-Consumers	China
Derrouiche et al., (2011)	To analyse and project its stability over time in Collaboration in business to business supply chains	Benefit and behavior of collaboration	Strategic	Quantitative	Enterprise – direct customers	Thailand
Setiawan et al. (2011)	To explore the system's approach to individual performance measurements of supply chain members in formulating supply chain performance improvement strategies.	Benefits of Collaboration	Strategic	Qualitative	producers (Farmer) - processor, distributor-consumers	Indonesia
Ageron et al. (2012)	To examine and evaluate the importance of IS/IT criterion in the suppliers selection process	Technology (IT/IS)	Operational	Qualitative	IT/IS Suppliers-company	French
Mutonyi and Gyau, (2013)	To propose in marketing and supply chain management literature to measure supply chain performance	Sustainability, benefits of collaboration	Operational	Qualitative	Company-consumers (Marketing channel)	Italy
Najmi et al. (2013)	To review whit approaches, techniques and criteria for SC performance evaluation are reviewed.	Benefits of Collaboration	Strategic	Qualitative	Company-consumers	Iran
Chang et al. (2013)	To study the relationship between e-procurement and supply chain performance	Benefit and culture of collaboration, Technology, social relationship	Strategic	Qualitative	Suppliers-Buyers	-
Singh et al. (2014).	To measure the impact of vertical coordination concerning to vegetable supply chain industry used for the prediction of the importance of different variables.	Benefits of Collaboration	Strategic	Quantitative	Farmers-retails-consumers	India
Selviaridis and Norrman, (2014)	To draws on agency theory and two cases of logistics service supply chains, in the food retail and automotive industries respectively, and to identify key influencing factors.	Benefits of Collaboration	Strategic	Quantitative	Retail-consumers	Sweden
Taticchi et al. (2014)	To thoroughly analyse and investigate the ongoing aspects of the product lifecycle throughout the supply chain, through empirical evidence, built theory and/or practical testing	Benefits of Collaboration	Operational	Mix method	-	-
Michalski et al. 2014)	To examine the non-linear aspects of the relationship between asymmetry and performance in supply chains (SCs), under varying intensities of collaboration and integration.	Partner and Technology Trust.	Strategic	Quantitative	Retails-Consumers	Spain
Bahinipati, (2014)	Integrate farmer complex networks, food processing and supply to increase consumer end of operational effectiveness.	Technology and sustainability	Operational and tactical	Quantitative	Growers-Processor-Consumers	India
Handayati, et al. (2015)	To reviewing a holistic understanding on agri-food supply chain, particularly on issues related to coordination	Benefit of collaboration	Strategic	Qualitative	Suppliers-Buyers	Indonesia
Gichuru et al. (2015)	To investigate collaborative supply chain practices in the performance of Del Monte Kenya Ltd.	Benefits of Collaboration	Strategic	Mix method	Suppliers-food producers	Kenya

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Factors influencing CPS of Supply Chain Fresh produce in previous literature

Author, Years	Objective	Factors influencing	Planning Structure	Methodology	Chanel and structure Collaboration	Country
Rodrigues et al., (2015)	To develop a supply chain-driven model horizontal logistics collaboration (HLC).	Benefits of Collaboration	Strategic	Mix Method	Retailers-retailers' suppliers-logistics service	Europe
Hernández et al., (2015)	To assess this transformation value chain, focusing on small tomato farmers in West Java and the determinants of their market-channel choices (as well as the technology correlates of those choices	Technology	Operational and tactical	Quantitative	Farmers-traditional village traders/urban /modern wholesalers-supermarkets	Indonesia
Routroy and Behera (2016)	To review the agriculture supply chain (ASC) literature along mandimensions which include but are not restricted to scope, objective, wastages, driver, obstacle, outcome, etc.	Technology	Strategic	Qualitative	Suppliers-distributors-consumers	-
Zhong and Wang, (2016)	To review the food supply chain management (FSCM) in terms of systems and implementations so that observations and lessons from this research could be useful for academia and industrial practitioners in the future.	Technology	Strategic	Qualitative	-	-
Tecco et al. (2016)	To concern for products that meet the requirements of sustainability is a key factor that drives consumers and can be the engine of a successful economy in the food businesses in the fresh fruit and vegetables,	Sustainability, environmental impacts and trust.	Strategic	Qualitative	Suppliers-buyers	Europe
Nakandala et al. (2017)	To systematically review the literature on information integration in the fresh food supply chain (FFSC) from a holistic perspective.	Technology	Strategic	Qualitative	Suppliers-Producers-Processor-wholesalers-Retails include Logistic partners providers	-
Sangwan et al., (2017)	To develop various activities, decision variable, and performance indicators based on four basic activities under reverse logistics.	Benefits of Collaboration	Strategic	Quantitative	External suppliers-Processors-Distributors-Retails-Consumers	Germany
Lau et al. (2017)	To develop a business process decision model to assess the non-compensating food safety sub-criteria in order to disqualify fresh food suppliers that cannot reach the minimum threshold for low probable food safety failure	Sustainability	Strategic	Quantitative	Suppliers-Supermarkets-Consumers	Australia
Sari et al. (2017)	To analyze performance of vegetable supply chains and contract farming partnerships in company	Cultural collaborations	Strategic	Quantitative	Farmers-modern market	Indonesia
Septiana et al. (2017)	To study was conducted in Brebes as the largest shallots production center in Indonesia.	Benefits, cultures of collaboration	Strategic	Quantitative	Farmers-traders-wholesalers-retailers	Indonesia
Gardas et al. (2018)	To considered and classified the supply chain performance measurement systems as approaches and techniques and followed a systematic literature	Sustainability	Strategic	Quantitative	food production-processor distribution	India

**Table 1**  
Factors influencing CPS of Supply Chain Fresh produce in previous literature

Author, Years	Objective	Factors influencing	Planning Structure	Methodology	Chanel and structure Collaboration	Country
Aharonovitz, et al. (2018)	To evaluate the effect of logistics collaboration, meetings, relationship history, and supplier selection on the logistics performance of shippers, carriers, and logistics services providers.	Benefit and culture of collaboration, trust, social relationship	Strategic	Quantitative	Suppliers-shippers-carriers-logistics services providers	Brazil
Makalew et al. (2019)	To see the effect of Supply Chain Management on Competitive Advantage in Company	Benefit of collaboration, trust, social relationship	Strategic	Quantitative	Producers-Consumers	Indonesia
Mirkovski, et al. (2019)	To explain why and how the external environment, governance structures, and interpersonal relationships influence information-sharing enabled information and communication technology (ICT) in the supply chain (SC) of developing country SMEs.	Social relationship, technology	Strategic	Quantitative	Producers-Consumers included Government	Republic of North Macedonia and China
Wilson, et al. (2019)	To analyse of the concept of resilience in supply chain management studies mostly focuses on the downstream side of the value chain and tacitly assumes an unlimited supply of raw material	Sustainability; Socio Schology	Strategic	Qualitative	Producers-Retails-Consumers-	-
Weber, (2019)	To purpose of this multiple case study was to explore the strategies some food and beverage industry leaders in the US used for implementing sustainable water consumption practices to improve operational efficiency.	Sustainability	Operational	Quantitative	Producers-consumers	United States
Aleruchi, (2019)	To purpose of this multiple case study was to explore the strategies that supply chain managers in the retail grocery business used to minimize perishable food loss.	Tecnology	Strategic	Quantitative	Retails-Consumers	United States
Damang et al. (2019)	The purpose of this study was to examine the effect of supply chain strategy toward business competitiveness of passion fruit industry in South Sulawesi	Sustainability	Strategic	Quantitative	Producers-Consumers	Indonesia
Kumar , et al. (2019)	To study in the concept of SSC performance as a formative construct of two three-dimensional order by three first-order reflective constructs and examining the effect of sustained performance on barriers to sustainability through collaboration.	Collaboration culture, Social relationship, Technology, and Environment friendliness	Strategic	Quantitative	Supliers-Buyers	India
Vetter et al. (2019)	To explores this phenomenon and the concerted efforts that government and corporate actors undertake with regard to agri-food value chain	Sustainability	Strategic	Qualitative	Suppliers-Distributors-Retails included government	Indonesia
Cappelleso and Thomé, (2019)	To review on innovation and the food supply chain to synthesise and explore their interactions, determining what it is known and what gaps there are in the knowledge regarding these subjects.	Technology	Strategic	Qualitative	Producers-Consumers	-
Sutdueana, et al. (2019)	To Study relationship with integration between supply chain collaboration, market communication, and supply chain performance	Social relationship	Strategic	Quantitative	Retails-Consumers	-
Hoa et al. (2020)	To make model dynamic interactions of factors that contribute to the logistics center building	Benefit of collaboration	Strategic	Mix method	Logistics center-Consumers	Vietnam



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