AGRARIS: *Journal of Agribusiness and Rural Development Research*

Vol. 9 No. 1 January-June 2023, Pages: 79-99

Article history:
Submitted : July 28th, 2022
Revised : February 19th, 2023
February 6th, 2023
Accepted : March 7th, 2023

Edi Susanto[1,2,*], Norfaridatul Akmaliah Othman[2], Arief Irfan Syah Tjaja[1], Suwarni Tri Rahayu[3], Sri Gunawan[4], and Adi Saptari[2,5]

[1] Faculty of Industrial Technology, Institut Teknologi Nasional Bandung, Jl. PKH Mustapa No. 23, Bandung, Indonesia

[2] Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka, Jalan TU62, 75450 Ayer Keroh, Melaka, Malaysia

[3] Research Centre for Appropriate Technology, National Research and Innovation Agency, KS Tubun Street No. 5 Cigadung, Subang, West Java, Indonesia

[4] Department of Agrotechnology, Faculty of Agriculture, Stiper Agricultural Institute Yogyakarta, Jl. Nangka II, Depok, Sleman, Yogyakarta, Indonesia

[5] Faculty of Business, President University, Jababeka Education Park, Jl Kihajar Dewantara, Cikarang Utara, Bekasi Regency, West Java, Indonesia

*) Correspondence email: edsusanto@itenas.ac.id

The Impact of Collaborative Networks on Supply Chain Performance: A Case Study of Fresh Vegetable Commodities in Indonesia

DOI: https://doi.org/10.18196/agraris.v9i1.134

ABSTRACT

A collaborative performance system focuses on sustainable performance management in a sustainable supply chain. This system was employed to determine the relationship between the farmer group association (*Gapoktan*) of Lembang Agri (LA) that produce fresh vegetables and supermarkets as purchasing partners to improve performance. This study is crucial due to the shift in farmers' roles from merely producers to entrepreneurs. This study utilized the dependency theory to explore the impact of collaborative networks on information and resource sharing and supply chain performance, as well as determine the appropriate orientation for collaborative supply chain indicators. The study surveyed 80 respondents representing different types of partnership structures from a parallel or supplier-buyer supply chain structure perspective. Moreover, the model developed on collaborative networks, information sharing, resource sharing and supply chain performance was analyzed using structural equation modeling (SEM). The results unveiled a positive and significant indirect relationship between collaborative networks and supply chain performance. The implication could be applied to identify the developing theories concerning collaborative network relationships and information and resource sharing related to supply chain performance on their networks, especially in producing fresh horticultural commodities. This study is essential to enrich the limited research in this industry.

Keywords: Collaborative network; Quality Control Circle (QCC); Supply chain; Fresh vegetable; Supplier-buyer

INTRODUCTION

A relatively stable trade volume for fresh vegetable commodities was recorded for Indonesia's potential horticultural products during the COVID-19 pandemic (Berita Satu, 2022). However, several products have been imported in recent decades due to the increasing demand. It was indicated that approximately 35% of fresh produce sales in the country in 2001 were imported, increasing to 30% in 2008 and 50% in 2018 (Kementerian Pertanian Republik Indonesia, 2018). The highest volume has been imported from America, China, Thailand, and other Southeast Asian countries.

Some general and specific issues have been identified in the collaborative chain of the farmer group association (*Gapoktan*) of Lembang Agri (LA). Firstly, as the chain leader, supermarkets determine and control the products, specifications, and restock schedule. However, *Gapoktan* experience a lack of accurate product specifications and schedule information in a medium-term order package. In addition, the supermarkets set high product quality standards, which most farmers cannot meet. An observation unveiled that past transactions were neglected and replaced with more obvious collaborations between the chain members (Maertens, Minten, & Swinnen, 2012). It is also essential to note that high-quality standards usually lead to a high proportion of rejected products, with supermarkets exploiting their purchasing power to penalize suppliers, while the case is not the same for farmers as suppliers. Moreover, the third issue is associated with product availability and the increasing variation of fresh products offered by importers. Accordingly, a relationship has been established between these importers and several exporters from different countries to have a consistent supply of products.

A crucial step in operations management aims to maintain and improve performance through continuous planning, measurement, and evaluation using a performance measurement system (Heizer & Render, 2015). Furthermore, different models have been developed to perform this function, from partial to comprehensive, and the balanced scorecard (BSC) was reported to be the most popular due to its simplicity and application (Gunasekaran & Kobu, 2007; Piotrowicz & Cuthbertson, 2015). Other examples include the performance management (PM) system within the supply chain collaboration framework (Papakiriakopoulos & Pramatari, 2010), scorecards, and web portals through the design of two special web portals of a business activity and its service (Stefanovic & Stefanovic, 2011), Taticchi, Garengo, Nudurupati, Tonelli, and Pasqualino (2015), and integration of PM and sustainable supply chain management (SSCM) by combining decision support tool (DST) with PM and SSCM. Moreover, the collaborative business ecosystem (CBE) model was applied to assess metrics, calibrate scales using ratios and standard normalization methods (Beske-Janssen, Johnson, & Schaltegger, 2015; Graça & Camarinha-Matos, 2016), and conduct sustainability performance measurements for SSCM. These systems usually assist companies in remaining competitive continuously. Unfortunately, their application is still rare. It was reported that most farmers did not have these systems, resulting in no references to improve their performance (Cocca & Alberti, 2010). Therefore, farmers must develop new innovative farming systems, as well as organization and objective implementation adapted to changing production systems (Martin, Martin-Clouaire, & Duru, 2013). However, it is crucial to note that performance is necessary to ensure the sustenance of businesses, and farmers are normally under great pressure from retailers and regulators to maintain and enhance their performance constantly. Modern markets such as supermarkets have become the recent alternatives for farmers to sell their products, causing them to implement different creative efforts toward ensuring more efficiency in serving these modern markets better (Mukti, Kusumo, & Pardian, 2017). Meanwhile, there has been no conscious effort to understand the importance of developing a performance management system (PMS) at the farmer level in collaboration with supermarkets as buyers. These buyers usually have stronger resources to manage the system expected to extend them to their suppliers through the involvement of farmers in the planning and implementing of the collaborative performance system.

The PMS issues at the farmer level are associated with urgency at the supply chain level. Gapoktan LA feels it is essential to conceptualize a collaborative performance system with supermarkets as the buying partner to improve its performance, and for companies to further enhance existing exchanges information so that smoothness in operations increases and can maintain good relations with suppliers and consumers (Susanto & Othman, 2021). It aligns with the paradigm shift from the role of farmers as the producers of agricultural products and entrepreneurial-oriented farmers producing premium quality agricultural products for modern consumers (Saragih, 2015). Additionally, the issues are also linked to the modernization of agriculture and the improvement in the quality standards reflected in the certification for export-oriented agricultural products as indicated in modern retail markets or supermarkets. Accordingly, creating a performance management system that can accommodate common interests is necessary. The joint performance system must be able to respond to future challenges in maintaining business sustainability. It is not only supermarkets taking advantage of farmers' purchasing power but also Gapoktan farmers and partners in the fresh vegetable supply chain network. Hence, it triggers the importance of collaboration, which can be a win-win solution.

A collaborative performance system can be adopted for long-term goals and partnerships, and the required collaboration level is critical for aligning a sustainable supply chain (Shin, Park, & Park, 2019). This system can maintain business continuity and focus on strengthening the relationship for the entire supply chain, impacting the performance of the joint supply chain on the openness and awareness of all parties who understand each other and benefit each other in a partnership. Therefore, it is necessary to understand and analyze the interrelationships between existing variables to generate input associated with developing business collaboration on fresh farm produce.

In the entrepreneurial context, exploring collaborative dependency relationships with network partners and the influence of collaborative network relationships on collaboration variables such as resource sharing, information sharing, and supply chain performance is essential. Regarding the increasing importance of farmers, who should move from sole producers to entrepreneurial ones (Cheshire, Meurk, & Woods, 2013), they must become the main business actors in agriculture (Kementerian Pertanian Republik Indonesia, 2023). Research by Larsson (2012) examined organic farmers' entrepreneurial environment in Sweden and discovered that the entrepreneurial orientation of farmers improved the economy, society, and ecology, signifying that success lay in mutual trust, high involvement, shared norms, and reciprocity.

Empirical evidence was reported by Ajayi (2016), depicting a positive relationship between the entrepreneurial orientation of 235 Nigerian agricultural companies on the performance of agro-industry exports in the supply chain network. This entrepreneurial orientation would presumably spur the awareness of farmers to build an entrepreneurial environment, hence maintaining collaborative business relationships with buyers or partners to improve their SCM performance.

This study aims to determine the relationship between Gapoktan LA and its purchasing partners, supermarkets, to improve performance. This study also explored the influence of collaborative networks on information sharing, resource sharing, and supply chain performance using the dependency theory. It aims to determine the proper orientation for indicators of a collaborative supply chain through content analysis. Moreover, the main behavioral factors of collaborative relationships were identified, serving as a reference for improving organizational performance in the collaborative system of the sustainable agri-food supply chain (Dania, Xing, & Amer, 2018).

The observed linkages can be recommended as a reference for increasing supply chain collaboration to maintain and improve the sustainability of farmers' businesses, rarely discussed through empirical evidence in previous literature, especially dependence not only concerning resources but also on information sharing and supply chain performance. This evidence would contribute to further research. Other contributions are related to empirical evidence of the influence of collaborative networks on sharing information and resources and supply chain performance, rarely involving farmers in the collaboration of supply chain performance.

Theoretical Background and Hypothesis

Collaborative Network

As Andrevski (2009) stated, a collaborative network could enhance the performance strategy of a company. The concept involves developing a network model with four elements: suppliers, buyers, competitors; research organizations; universities; and government to build innovation (Tsai, 2009). It can also be a vertical network of clients, suppliers, and other companies (competitors) or a horizontal network of research institutions, universities, and the government (Zeng, Xie, & Tam, 2010). Moreover, the Quadruple Helix model also includes the scientific community, business, and government as actors (Schütz, Heidingsfelder, & Schraudner, 2019).

Information Sharing

Information sharing can develop a quality relationship, usually observed when companies share common goals and make efforts toward building active employees or good collaborative relationships (Fawcett, Magnan, & McCarter, 2008). Information sharing is a continuous flow of formal and informal communication between partners to have better planning and control in a chain (Miguel & Brito, 2011).

The transactional cost analysis focusing on different exchange costs between buyers and sellers demonstrated that information sharing reduce business costs and risks (Jraisat, Gotsi, & Bourlakis, 2013). It is due to its ability to ensure that information reaches every collaborative partner in the supply chain, increasing the possibility of meeting the market. Moreover, a study on green beans unveiled that the problems associated with satisfying market demands were due to low production, leading to outsourcing. Outsourcing significantly impacted time-based and cost-based competitiveness and customer and financial performance (Afum et al., 2021). The condition was observed to have caused high selling prices and increased transaction, distribution, and equipment costs. Tai (2011) also explained that sharing information services as a relationship marketing solution is normally applied to create customer value and build strong relationships with enterprise customers. Jraisat et al. (2013) analyzed the high export performance of fresh agri-food and reported that information sharing was motivated by an integration-focused reduction in transaction costs instead of an individualistic reduction. The benefits of information sharing can be classified into strategic, tactical, and operational (Gichuru, Iravo, & Arani, 2015; Misni & Lee, 2017). The strategic benefits include supply chain collaboration facilities, increased market share, and improved introduction of new products. These parameters were further categorized by Gichuru et al. (2015) into inventory level, new product development, and marketing planning.

Meanwhile, the tactical benefits cover improved communication, enhanced capacity allocation decisions, and more effective collaborative resource planning, forecasting, and control. The operational benefits encompass reduced inventory levels, waiting times, supply chain costs, and increased production and distribution schedules. Furthermore, these contexts indicate the relevant categories of essential information, including the operational, planning, customer requirements, and financial aspects. The operational information refers to those related to production, such as the determination of the schedule, order status for tracing, return status, inventory levels, and operating volumes. The planning information refers to sales forecasts, demand information, promotion, and production.

Meanwhile, the customer requirement aspect focuses on customer relations, desired product attributes, service requirements, product availability, delivery status, and customer satisfaction. The general financial aspect covers sales growth, profitability, and return on investment. Managers tend to perceive planning and financial information as equally crucial, but operational and customer requirements are more essential to an organization.

However, Jonsson and Mattsson (2013) reported that the supply chain attributes usually influenced the value of shared planning information. This observation was confirmed to be relevant in situations with moderate to high frequency of customer orders and two-tier supply chains with relatively short lead times. It simply illustrates a need to share information to have a sophisticated understanding of all supply chain attributes rather than rely on generalizations.

Resource Sharing

As Gong, Liu, and Lu (2015) reported, resource sharing could shorten the length of service for low inventory, reduce service time for emergencies, decrease loss rates for high customer satisfaction, and increase resource utilization compared to resource-exclusive models. In addition, the parameters normally utilized to measure resource sharing comprise skills and knowledge, specialization, and investment ability (Gichuru et al., 2015).

Supply Chain Performance

According to Heizer and Render (2015), supply chain performance involves all interactions between suppliers, producers, distributors, and consumers. It was reported that a significant relationship existed between management ability and organizational performance (Shu, 2012). The matrix indicator for supply chain performance is the collaboration to improve performance at the supply chain level in terms of capacity, customer order fulfillment, inventory, and responsiveness to consumer needs (Simatupang & Sridharan, 2005).

Following the theoretical basis, Figure 1 exhibits the constructed model with relationships developed into four hypotheses.

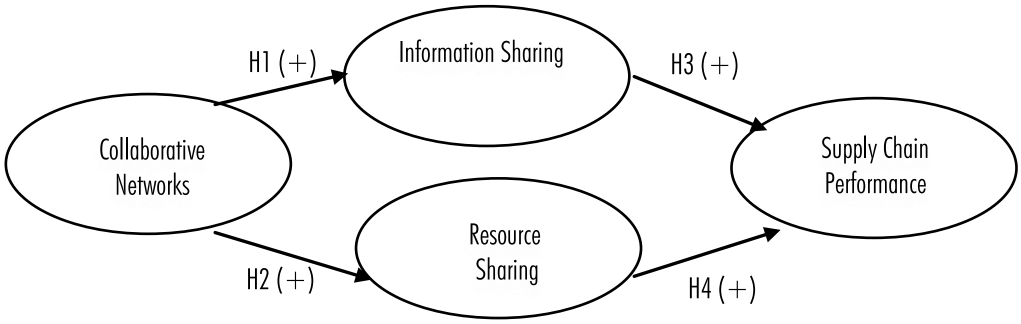

FIGURE 1. CONSTRUCT OF MODEL

Hypothesis Development

Figure 1 displays the constructed model, having relationships developed into four hypotheses. It was discovered by Doganay and Ergun (2017) that information sharing powerfully affected supply chain collaboration. Moreover, collaborative network relationships were observed to have a good influence on resource sharing, such that a higher sharing of resources led to better collaboration and performance (Cao, Vonderembse, Zhang, & Ragu-Nathan, 2010; Doganay & Ergun, 2017). The relationship of these two dimensions was employed to develop hypotheses 1 and 2 as follows.

Hypothesis 1: Collaborative networks are positively related to information sharing.

Hypothesis 2: Collaborative networks are positively related to resource sharing.

Furthermore, Nakandala, Samaranayake, Lau, and Ramanathan (2017) also disclosed that information sharing positively contributed to supply chain integration performance. Information sharing was discovered to be one of the main dimensions of integrating

information infrastructure required by organizational decision-makers. It was also holistically reported that the effective integration of information concerning fresh food supply chain entities could improve performance. It simply means that including information sharing in the supply chain is crucial, especially when involving numerous stakeholders and partners. Therefore, it led to the formulation of the following hypothesis.
Hypothesis 3: Information sharing is positively related to supply chain performance.

A previous study uncovered that resource sharing efficiently impacted supply chain performance (Gong et al., 2015), developing the following hypothesis.
Hypothesis 4: Resource sharing is positively related to supply chain performance.

RESEARCH METHOD

TABLE 1. RESEARCH OPERATION VARIABLES

Variable	Source/(author/yr)	Indicator	Code
Collaborative network (CON)	(Schütz et al., 2019)	1. Suppliers (Farmers/Gapoktan)	CON1
		2. Buyers (Supermarkets)	CON2
		3. Competitors	CON3
		4. Universities	CON4
		5. Government	CON5
		6. Research Institutes	CON6
Information sharing (ISR)	(Gichuru et al., 2015; Miguel & Brito, 2011)	1. Sharing inventory level	ISR1
		2. Continuous improvement in inventory efficiency	ISR2
		3. Sharing product development information	ISR3
		4. Facilities and new product development	ISR4
		5. Strengths and weaknesses of business and competitors	ISR5
		6. Planning to market the demand for products and services offered	ISR6
		7. Improved communication of capacity allocation decisions for production planning and scheduling	ISR7
		8. Improved sales forecast and product stock control	ISR8
		9. Improved business communication	ISR9
Resource sharing (RSR)	(Gichuru et al., 2015; Gong et al., 2015)	1. Increasing the utilization of low-cost resources	RSR1
		2. Improved skills and knowledge	RSR2
		3. Measuring the sharing of skills and knowledge resources of existing products	RSR3
		4. Knowledge of new technology products and systems	RSR4
		5. Increasing competence in product specialization	RSR5
		6. Product value addition	RSR6
		7. Product-related co-investment capability	RSR7
		8. Co-investment capabilities related to technology systems and facilities	RSR8
Supply chain performance (SPF)	(Simatupang & Sridharan, 2005)	1. Ability to provide products according to customers	SPF1
		2. Ability to fulfill orders on time, place and quantity	SPF2
		3. Consumer-appropriate inventory management capabilities	SPF3
		4. Responsiveness to trends in the business quickly and precisely	SPF4

This study involved 80 people as the respondents, comprising 75 fresh vegetable farmers being members of Gapoktan LA, representing 25% of the total 250 members, and five managers of supermarkets involved in the supply chain channel who understood the structure and had hands-on experience collaborating with partner companies. With more than 100 respondents, the sample size can be 10 to 15% or 20 to 25% or higher (Arikunto, 2010). Purposive sampling was applied to determine the 80 individuals as the study sample. The research instrument was a questionnaire designed using a Five Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". It is worth noting that the instrument underwent validation and reliability tests. Moreover, data were analyzed using multivariate analysis within confirmatory factor analysis (CFA). The indicators forming the latent constructs were assessed through average variance extracted (AVE), composite reliability (CR), and Cronbach alpha (α) based on the criteria (AVE > 0.5, CR > 0.7, and α > 0.7) before being applied in the CFA. These values were calculated in the SEM-PLS application, selected due to its effectiveness in analyzing a limited sample. Furthermore, the variables were determined based on the information presented in the hypotheses and summarized in Table 1.

RESULTS AND DISCUSSION

Description of The Respondents

The study population was the Gapoktan LA supply chain collaboration networks in Cikidang, West Bandung Regency, West Java, Indonesia. It was discovered that the respondents possessed a minimum experience of three years in their respective fields. It is also essential to note that the questionnaire was distributed directly to these respondents.

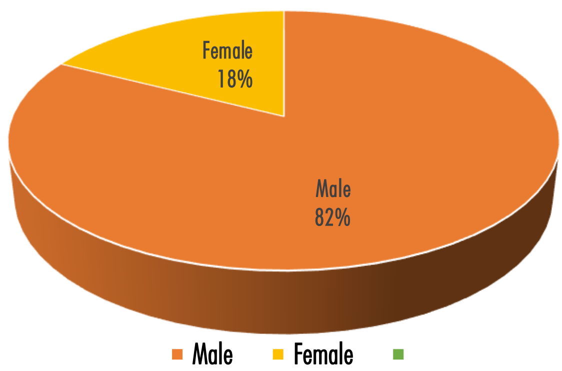

FIGURE 2. COMPOSITION OF MALE AND FEMALE RESPONDENTS

The demographic information depicted that of the 75 farmer respondents, 62 were men, and 13 were women, while the five supermarket managers comprised four men and one woman. As displayed in Figure 2, there were 66 (82%) male and 14 (18%) female respondents. It was also observed that most farmers (44%) were between 41 and 55 years of age, while only 6.7% were below 25 years. The supermarket managers demonstrated a similar trend as 60% were in the age range of 41 to 55 years, while none were below 25 or above 55 years. Of all respondents, 45% were between 41 and 55, while 6.25% were below 25 years.

Outer Measurement Model

The process utilized the outer loading parameter above 0.6, with an average variance extracted (AVE) higher than 0.5. The individual reflexive measurement correlates with the construct when the loading factor value is greater than 0.6, and the AVE value exceeds 0.5 (Ghozali & Latan, 2012; Jamshidi, Asadi, Kalantari, Azadi, & Scheffran, 2019). In short, an indicator has good reliability if the outer loading value for each indicator is above 0.6. Otherwise, if the loading value is less than 0.6, it is removed from the model.

TABLE 2. OUTER LOADING – ITERATION CALCULATION ALGORITHM

	Outer Loading (Calculation Algorithm)				*Result*	*Remark*
	CON	ISR	RSR	SPF		
CON1	0.808				Supporting	-
CON2	0.792				Supporting	-
CON3	0.740				Supporting	-
CON4	0.732				Supporting	-
CON5	0.840				Supporting	-
CON6	0.716				Supporting	-
ISR1		0.764			Supporting	-
ISR2		0.680			Supporting	-
ISR3		0.806			Supporting	-
ISR4		0.827			Supporting	-
ISR5		0.393			Not Supporting	Remove
ISR6		0.814			Supporting	-
ISR7		0.785			Supporting	-
ISR8		0.842			Supporting	-
ISR9		0.492			Not Supporting	Remove
RSR1			0.860		Supporting	-
RSR2			0.866		Supporting	-
RSR3			0.859		Supporting	-
RSR4			0.561		Not Supporting	Remove
RSR5			0.710		Supporting	-
RSR6			0.851		Supporting	-
RSR7			0.722		Supporting	-
RSR8			0.473		Not Supporting	Remove
SPF1				0.837	Supporting	-
SPF2				0.831	Supporting	-
SPF3				0.769	Supporting	-
SPF4				0.788	Supporting	-

Table 2 exhibits that the indicators of the information sharing (ISR) variable, with less than 0.6 loading factors, included strengths and weaknesses from the business and competitor perspective (ISR5) and communication improvement from the business and competitor perspective (ISR9). Meanwhile, resource sharing (RSR) covered product knowledge and new technology systems (RSR4) and co-investment capabilities related to technology systems and facilities (RSR8). After removing the four indicators, the measurement model was re-estimated. ISR5, ISR9, RSR4, and RSR8 were excluded from the model since their values were less than 0.6. Figure 3 displays the outer loading factor values for all variables exceeding 0.6, indicating that 23 indicators met the requirements. Therefore, all remaining indicators met the requirements for the measurement model and could be applied in the following step of the analysis. Discriminant validity was assessed based on cross-loading with the construct. A larger construct correlating well with the measurement item signifies a more accurate prediction.

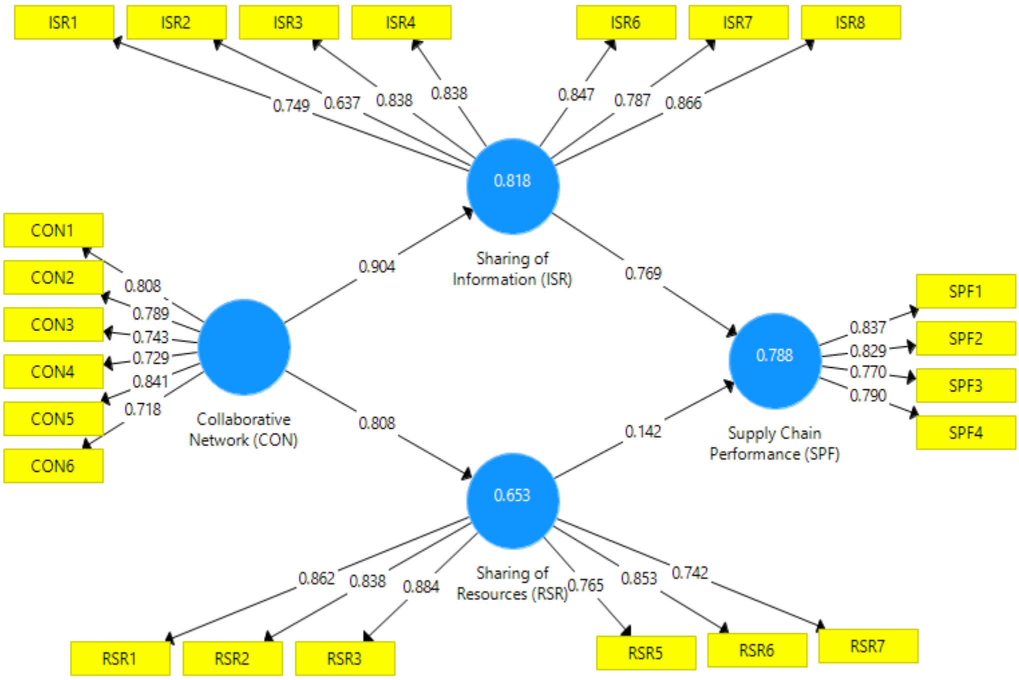

FIGURE 3. OUTER MODEL

Table 3 illustrates the root AVE value of each construct; all met the discriminant validity. Additionally, a composite reliability test was conducted on the measurement model to prove the accuracy and consistency of the instrument in measuring a construction, achieved through two methods in SEM using Smart-PLS, including Cronbach's Alpha (CA) and Composite Reliability (CR). However, CA usually provides a lower or underestimated value. Hence, CR is more advisable. Table 4 portrays that all variables acquired CA or CR values higher than 0.70 and AVE greater than 0.50, implying valid and reliable results. Hence, it could be applied to test the structural model.

TABLE 3. AVE ROOT VALUE AND CORRELATION BETWEEN LATENT VARIABLES

	CON	ISR	RSR	SPF
CON	0.773			
ISR	0.904	0.798		
RSR	0.808	0.810	0.826	
SPF	0.873	0.884	0.765	0.807

TABLE 4. RELIABILITY AND VALIDITY

	CA	rho-A	CR	AVE
CON	0.865	0.873	0.899	0.597
ISR	0.903	0.904	0.924	0.637
RSR	0.906	0.913	0.927	0.682
SPF	0.821	0.825	0.882	0.651

Collinearity Statistics (VIF)

The collinearity statistics test was performed to examine the existence of multicollinearity problems at the outer model level. The results were determined based on the VIF value presented in Table 5. No multicollinearity problem was observed, as indicated by all indicators obtaining VIF values lower than 0.5.

TABLE 5. COLLINEARITY STATISTIC (VIF)

	VIF		VIF		VIF		VIF
CON1	2.671	ISR1	2.019	ISR8	4.680	RSR7	2.109
CON2	2.609	ISR2	2.020	RSR1	3.311	SPF1	1.982
CON3	2.581	ISR3	3.658	RSR2	2.923	SPF2	1.820
CON4	2.057	ISR4	3.031	RSR3	4.272	SPF3	1.695
CON5	2.627	ISR6	4.150	RSR5	2.483	SPF4	1.771
CON6	2.418	ISR7	2.176	RSR6	2.774		

Structural Model Analysis

The structural or inner model was evaluated to predict the relationship between the main variables. It was achieved through the magnitude of the variance, represented by the R-Square value for the independent variable and the AVE for predictiveness, using sampling procedures such as jackknifing and bootstrapping to determine the stability of the estimate.

The coefficient of determination (R-Square value), according to Chin (1998), is strong if it is higher than 0.67 and moderate if it is between 0.3 to 0.67. Table 6 depicts that all variables: collaborative networks on information sharing (strong category), collaborative networks on resource sharing (moderate category), and collaborative networks on supply chain performance (strong), met the criteria.

TABLE 6. COEFFICIENT OF DETERMINATION OF R-SQUARE (R^2)

	R Square	R Square Adjustable (R^2)
ISR	0.818	0.815
RSR	0.653	0.648
SPF	0.788	0.783

Hypothesis Test

The bootstrapping test was employed to determine the relationship between the variables, representing a nonparametric approach to evaluate the estimate's accuracy. Meanwhile, the decision to accept or reject a hypothesis in the Partial Least Square (PLS) method was based on the significance value (P-value) and the T–table value. The Smart-PLS application could determine this significant value through the parameter coefficient and statistical significance values. Ha is accepted, and Ho is rejected when the t-value exceeds 1.96, and the P-value is less than 0.05 (α= 5%). Conversely, Ha is rejected, and Ho is accepted if the t-value is lower than 1.96 and the P-value is higher than 0.05 (α = 5%). Table 7 exhibits the results for the path coefficient of the collaborative networks, having a significant positive effect

ISSN: 2407-814X (p); 2527-9238 (e)

on information sharing (O=0.904; t-statistic=46.727; P-value=0.000), confirming the first hypothesis (H1).

TABLE 7. PATH COEFFICIENT WITH BOOTSTRAPPING METHOD

	Original Sample (O)	Sample Mean (M)	Standard Deviation	T Statistics	P Value
CON → ISR	0.904	0.906	0.019	46.727	0.000
CON → RSR	0.808	0.812	0.034	23.788	0.000
ISR→ SPF	0.769	0.767	0.088	8.779	0.000
RSR→ SPF	0.142	0.147	0.108	1.317	0.188

Moreover, collaborative networks significantly and positively affected resource sharing, proving the second hypothesis (H2). It was discovered that information sharing had a significant and positive effect on supply chain performance, indicating the acceptance of the third hypothesis (H3). Meanwhile, resource sharing had a less significant effect on the supply chain performance (O=0.142; t-statistic=0.317; P-value=0.188), signifying that the fourth hypothesis (H4) was not proven.

As indicated in Table 8, the model demonstrated an indirect relationship between CON and SPF (as an additional hypothesis). It was discovered that a collaborative network significantly and positively affected the supply chain (O=0.810; t-statistic=26,783; P-value=0.000), proving the hypothesis. In short, collaboration could improve company performance (Aharonovitz, Vieira, & Suyama, 2018; Rodrigues, Harris, & Mason, 2015; Sangwan, 2017), and implementing collaborative networks is also expected to boost supply chain performance. Simatupang and Sridharan (2008) further confirmed that collaboration should enhance performance in terms of fulfillment, supply, and responsiveness at the supply chain level.

TABLE 8. INDIRECT EFFECTS

	Original Sample (O)	Sample Mean (M)	Deviation Standard	T Statistics	P Value
CON → SPF	0.810	0.815	0.030	26.783	0.000

Prediction Relevance

The Q-square (Q2) test was utilized to assess the predictive relevance. While Q2 higher than 0 signifies the model has accurate predictive relevance for the construct, while Q2 lower than 0 indicates that it lacks predictive relevance. This test is essential to determine the relevance of the predictions obtained. The PLS-SEM Q2 was calculated through the Blindfolding method.

TABLE 9. RELEVANCE PREDICTION - BLINDFOLDING RESULTS

	SSO	SSE	Q^2 (=1-SSE/SSO)
ISR	560,000	277,963	0,504
RSR	480,000	273,506	0,430
SPF	320,000	161,631	0,495

Table 9 unveiled the Q2 values for the predictions of CON to ISR (Q2=0.504), CON to RSR (Q2=0.430), as well as ISR and RSR to SPF (Q2=0.495). The cross-validated redundancy (Q2) values were all above 0, indicating that the construct accepted H0. Therefore, the model developed in this study was accurate.

Discussion

This study revealed that higher collaborative networks enhanced information sharing in agricultural businesses, especially on fresh produce. The results of the first hypothesis align with (Jraisat et al., 2013), who examined the performance of fresh agri-food exports; sharing information positively impacted reducing transaction costs. In Addition, Aragón-Correa, Martín-Tapia, & Hurtado-Torres (2013), who studied the collaboration practices of 164 pharmaceutical companies operating in 27 countries, postulated a positive and significant relationship between sharing information with employees and promoting employee collaboration and a proactive environment in each company. Furthermore, Panahifar, Byrne, Salam, and Heavey (2018) surveyed 189 executives in various companies, describing how information sharing in the confirmed system, containing sales growth and the company's overall operational performance, was perceived. The level of information sharing in the collaboration networks with other individuals or institutions in a supply chain organization increased the positive relationship within the networks. Knowledge sharing and acquisition by enterprises grew with both the vertical structure, encompassing suppliers, and the horizontal structure, including universities. Expanding the company's existing knowledge base and higher collaboration aims to raise the direct frequency of external factors and ensure the exchange of corporate strategic resources within the supply chain networks. It conforms with the findings of Doganay and Ergun (2017) that sharing information significantly affected supply chain collaboration.

The study results confirmed the second hypothesis, demonstrating that a more extensive collaborative network led to more widespread resource sharing in this commodity. It is in line with the findings of previous studies, unveiling that collaborative networks positively influenced resource sharing since higher resource-sharing opportunities led to better collaboration. A study by Cao et al. (2010) has highlighted the benefits of large-scale supply chain collaboration, including leveraging the valuable resources and knowledge of key suppliers and customers to reduce uncertainty, lowering transaction costs, building core competencies, seizing opportunities for learning and knowledge creation, and enhancing competitive position. Valid and reliable instruments were developed to measure supply chain collaboration through rigorous literature analysis, empirical evidence, and statistics, including structured interviews and Q-sort in large-scale studies. The results uncovered a conceptualization of supply chain collaboration from several elements interconnected in a collaborative supply chain network, such as information sharing and common resource sharing. Both H1 and H2 were confirmed in this study. Higher opportunities for sharing information and resources led to better collaboration (Cao et al., 2010; Doganay & Ergun, 2017).

Following the results of the third hypothesis, information sharing delivered properly could enhance supply chain performance. The findings revealed by Nakandala et al. (2017)

reinforce that information sharing positively affected supply chain performance. It was also observed that information-sharing integration has emerged as one of the main dimensions of infrastructure normally deployed by decision-makers at the organizational level. It was also holistically discovered to be effective in disclosing updated information required to improve performance in the fresh food supply chain.

Meaningful information integration is crucial to the effectiveness and efficiency of supply chain practices involving several stakeholders and partners (Gurzawska, 2020; Nakandala et al., 2017). It also has the potential to boost the competitive advantage of products. Camisón and Villar-López (2014) reported that it could maintain business sustainability at the farmer level for organizations in the supply chain networks and their partner companies (Beske-Janssen et al., 2015; Susanto et al., 2022). Likewise, Doganay and Ergun (2017) conducted a study on collaborative networks concerning suppliers and customers, with 212 response samples from around 1,500 companies related to supply chain networks, including those on the first list of 1,000 industrial companies included in ISO 500 -1 and ISO 500 – 2 in Turkey. The research objectives are different, but the networks and relationships involved, especially the supplier-buyer relationship within a collaborative supply chain, are comparable to what is being studied here. ISR and RSR collaboration in the supply chain positively affected SPF. Hence, organizations in the partner supply chain networks could improve the supply chain performance of these variables. Accordingly, it forced organizations to work together to achieve and maintain high customer satisfaction. This study confirmed H1 (CON had a positive effect on ISR), H2 (CON had a positive effect on RSR), and H3 (ISR had a positive effect on SPF). Meanwhile, the RSR relationship directly affected SPF.

Previous research unveiled that resource sharing efficiently impacted supply chain performance (Doganay & Ergun, 2017; Gong et al., 2015). However, the findings from the test conducted on the fourth hypothesis revealed no direct or less significant relationship between resource sharing and supply chain performance. It contradicts the findings of the previous study, discovering that resource sharing shortened the length of service for low inventory, reduced service time for emergencies, decreased loss rates, ensured high customer satisfaction, and increased resource utilization compared to the exclusive resource model (Gong et al., 2015). The collaborative relationship in this study did not exhibit the complex sharing of resources. The mechanism to share information was limited to warehousing and improving the skills and products in the supermarkets. None have been spotted focusing on ensuring high investment in workforce collaboration, project management and team improvement, quality control circles (QCC), and co-investment in equipment and technology. It is partly because this study did not accommodate reinforcing indicators to strengthen the effect of information sharing on supply chain performance, such as the utilization of low-cost resources through the order information system, increase in skills and knowledge, sharing of information on resources, enhanced competence in product specialization, and value-added products.

In contrast, Hall and Saygin (2012) addressed the effect of information sharing on resources through experimental simulation. However, they focused on resource sharing on the level of timely delivery and total cost, the level of interaction between capacity tightness, and discovering a significant relationship. However, the study did not address the impact of resource sharing low-cost resources through a to-order information system, upgrading skills and knowledge, increasing competence in product specialization, and adding value to products. It explained that the interaction level relied on the operational parameter and the flexibility available in the supply chain. The coordination tool's ability to share could also depend on the strategic parameter of each SCM organization regarding technology strategy, organizational capabilities and capacities, and other factors (Kumar, K. Singh, & Shankar, 2014; Lohmer, Bugert, & Lasch, 2020). It suggests an area for future research to address gaps in the literature. Due to the perishable nature of fresh products, employing high technology, such as the addition of cold storage facilities in warehouse facilities, is essential. However, this research only examined a group of buyers who shopped at L-marts in five locations. Therefore, future studies should add more information from other retailers and several fresh marts or modern markets to obtain more accurate information.

In line with the findings of previous studies that collaboration could boost company performance (Nakandala et al., 2017; Srinivasan, Mukherjee, & Gaur, 2011), the hypothesis was established, and the test results disclosed that high collaborative networks affected supply chain performance further. It agrees with Simatupang and Sridharan (2008), revealing that collaboration could enhance supply chain performance concerning fulfillment, supply, and responsiveness. Other studies depicted similar results (Assbeihat, 2016; Srinivasan et al., 2011). Some highlighted impacts included product availability, order fulfillment at the appropriate place and quantity, speed of response to business trends, and consumer satisfaction.

For quite a long time, a supply chain network relationship has been established between the stakeholders associated with fresh vegetables in Gapoktan LA. This study demonstrated that the system could be improved through managerial and technical training from the local government, agricultural organizations, and universities, such as ITENAS Bandung, UNPAD, and others. It is consistent with the findings of Cordeiro, Viana, and Silveira (2022), who consolidated the roles of 96 Brazilian milk producers and studied the impact of coaching Meso-institutions on increased knowledge and institutional relationships with local government and existing research institutions, discovering a strong correlation between coaching and increased knowledge. The institutions also provided a subsidy for public and private policies, especially highlighting the importance of Meso as the intermediary between the macro-level and the economic and social issues of producers. The results disclosed that effective monitoring positively affected the perception of the performance of milk producers. Concerning the subsidy by other private and government institutions in the networks of Gapoktan LA, it was appropriate as it impacted improving quality, saving small producers, and potential assistance in procuring process infrastructure and products (Cordeiro et al., 2022). The subsidy in this study refers to the provision of assistance by Bank Indonesia regarding cold storage facilities to maintain the quality of the products. These are expected to be the significant positive impact of collaborative networking on information and resource sharing. Moreover, information management system facilities guarantee that all collaborative partners have instantaneous access to the most recent product changes.

Meanwhile, there has been an urgent need to enhance resource sharing, especially concerning joint investment for new products and technologies observed to be inefficient. Moreover, the mechanism and division of work should be boosted, such as implementing joint control with continuous improvement through a quality constraint cluster system to optimize the existing constraints while prioritizing common interests toward achieving a win-win solution. Furthermore, the collaborative network relationship possessed a positive and significant indirect effect on supply chain performance, illustrated by the role of partners in collaborative networks to provide mutually beneficial partnerships.

CONCLUSION

This study confirmed that collaborative networks had a significant positive effect on information sharing, and a similar trend was observed between information sharing and supply chain performance. Meanwhile, collaborative networkssignificantly and positively affected resource sharing. Subsequently, the collaborative network relationship significantly and positively affected supply chain performance (SPF) in fresh vegetables. In contrast, the resource sharing mechanism less directly impacted supply chain performance. Supply chain collaboration between companies and farmers in *Gapoktan* Lembang Agri must be preserved at all costs; the level of interaction depended on operations and strategic development by following the design of strategic innovation. Managers must hold an 'innovation strategy meeting' by designing strategy and culture. Moreover, it is necessary to enhance the mechanism to share resources more broadly in terms of joint or team management to prevent overburdening one partner in developing new products or technologies and to maintain the viability of all the partners. Further research should utilize additional information from other retailers operating as buyers to have a larger sample and obtain more accurate results.

This research has implications for additional insights and limited studies regarding dependency theory as it applied supply chain collaborative variables in content analysis of dependency on information sharing and supply chain performance. Previous literature solely addressed dependence theory in terms of content and resource exchange. While the existing literature rarely includes farmers in supply chain collaborative performance, other contributions offer implications for the agricultural sector and actors (supermarkets and farmers) in these and other fields and input for stakeholders. These contributions include empirical evidence of the influence of collaborative networks on sharing information and resources and supply chain performance. Collaborative networks also significantly and positively affected supply chain performance in fresh vegetables. These findings enrich theoretical and practical material for future studies.

Acknowledgments: The authors are grateful to the Institut Teknologi Nasional Bandung-Indonesia for the PDMI grant for the 2021 fiscal year and Universiti Teknikal Malaysia Melaka (UTEM)-Malaysia for supporting this research.

Authors' Contributions: ES wrote the first draft of the article, validated the research methodology, prepared the questionnaires, collected data, interpreted the results, and wrote the final manuscript. STR prepared the questionnaire and collected data. AIST supported to collected data. AS conducted data analysis, interpreted the results and discussion of paper revision. SG validated the results, discussion, and final manuscript preparation. NAO validated the research methodology, collected data, supervised the data analysis and interpretation, and reviewed the manuscript.

Conflict of interest: The authors do not have any conflict of interest.

REFERENCES

Afum, E., Agyabeng-Mensah, Y., Acquah, I. S. K., Baah, C., Dacosta, E., Owusu, C. S., & Amponsah Owusu, J. (2021). Examining the Links between Logistics Outsourcing, Company Competitiveness and Selected Performances: The Evidence from an Emerging Country. *The International Journal of Logistics Management*, *32*(3), 1068–1090. https://doi.org/10.1108/IJLM-05-2020-0205

Aharonovitz, M. C. S., Vieira, J. G. V., & Suyama, S. S. (2018). How Logistics Performance is Affected by Supply Chain Relationships. *The International Journal of Logistics Management*, *29*(1), 284–307. https://doi.org/10.1108/IJLM-09-2016-0204

Ajayi, B. (2016). The Impact of Entrepreneurial Orientation and Networking Capabilities on the Export Performance of Nigerian Agricultural SMEs. *Journal of Entrepreneurship and Innovation in Emerging Economies*, *2*(1), 1–23. https://doi.org/10.1177/2393957515619720

Andrevski, G. (2009). *Competitive Strategy, Alliance Networks, and Firm Performance* (Doctoral Dissertation, University of Kentucky, Kentucky, United States). Retrieved from https://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1713&context=gradschool_diss

Aragón-Correa, J. A., Martín-Tapia, I., & Hurtado-Torres, N. E. (2013). Proactive Environmental Strategies and Employee Inclusion: The Positive Effects of Information Sharing and Promoting Collaboration and the Influence of Uncertainty. *Organization and Environment*, *26*(2), 139–161. https://doi.org/10.1177/1086026613489034

Arikunto, S. (2010). *Prosedur Penelitian Suatu Pendekatan Praktek*. Jakarta: Rineka Cipta.

Assbeihat, J. M. (2016). The Impact of Collaboration among Members on Team's Performance. *Management and Administrative Sciences Review*, *5*(5).

Berita Satu. (2022). Kemtan: Produksi Pertanian dan Sayuran Segar Sangat Mencukupi. Retrieved https://www.beritasatu.com/ekonomi/636973/kemtan-produksi-pertanian-dan-sayuran-segar-sangat-mencukupi

Beske-Janssen, P., Johnson, M. P., & Schaltegger, S. (2015). 20 Years of Performance Measurement in Sustainable Supply Chain Management – What Has Been Achieved? *Supply Chain Management*, *20*(6), 664–680. https://doi.org/10.1108/SCM-06-2015-0216

Camisón, C., & Villar-López, A. (2014). Organizational Innovation as An Enabler of Technological Innovation Capabilities and Firm Performance. *Journal of Business Research*, *67*(1), 2891–2902. https://doi.org/10.1016/j.jbusres.2012.06.004

Cao, M., Vonderembse, M. A., Zhang, Q., & Ragu-Nathan, T. S. (2010). Supply Chain Collaboration: Conceptualisation and Instrument Development. *International Journal of Production Research*, *48*(22), 6613–6635. https://doi.org/10.1080/00207540903349039

Cheshire, L., Meurk, C., & Woods, M. (2013). Decoupling Farm, Farming and Place: Recombinant Attachments of Globally Engaged Family Farmers. *Journal of Rural Studies*, *30*, 64–74. https://doi.org/10.1016/j.jrurstud.2012.11.005

Chin, W. W. (1998). The Partial Least Square Approach to Structural Equation Modeling. In G. A. Marcoulides (Ed.), *Modern Method for Business Research*. New Jersey: Lawrence Erlbaum Associates.

Cocca, P., & Alberti, M. (2010). A Framework to Assess Performance Measurement Systems in SMEs. *International Journal of Productivity and Performance Management*, *59*(2), 186–200. https://doi.org/10.1108/17410401011014258

Cordeiro, M. P., Viana, J. G. A., & Silveira, V. C. P. (2022). Influence of Meso-Institutions on Milk Supply Chain Performance: A Case Study in Rio Grande Do Sul, Brazil. *Agriculture*, *12*(4), 482. https://doi.org/10.3390/agriculture12040482

Dania, W. A. P., Xing, K., & Amer, Y. (2018). Collaboration Behavioural Factors for Sustainable Agri-food Supply Chains: A Systematic Review. *Journal of Cleaner Production*, *186*, 851–864. https://doi.org/10.1016/j.jclepro.2018.03.148

Doganay, A., & Ergun, S. (2017). The Effect of Supply Chain Collaboration on Supply Chaıin Performance. *Journal of Management Marketing and Logistics*, *4*(1), 30–39. https://doi.org/10.17261/pressacademia.2017.377

Fawcett, S. E., Magnan, G. M., & McCarter, M. W. (2008). Benefits, Barriers, and Bridges to Effective Supply Chain Management. *Supply Chain Management*, *13*(1), 35–48. https://doi.org/10.1108/13598540810850300

Ghozali, I., & Latan, H. (2012). *Partial Least Square Konsep, Teknik dan Aplikasi Menggunakan Program SmartPLS 2.0 M3*. Semarang: Badan Penerbit Universitas Diponegoro.

Gichuru, M., Iravo, M., & Arani, W. (2015). Collaborative Supply Chain Practices on Performance of Food and Beverages Companies: A Case Study of Del Monte Kenya Ltd. *International Journal of Academic Research in Business and Social Sciences*, *5*(11), 17–31. https://doi.org/10.6007/ijarbss/v5-i11/1890

Gong, D., Liu, S., & Lu, X. (2015). Modelling the Impacts of Resource Sharing on Supply Chain Efficiency. *International Journal of Simulation Modelling*, *14*(4), 744–755. https://doi.org/10.2507/IJSIMM14(4)CO20

Graça, P., & Camarinha-Matos, L. M. (2016). A Proposal of Performance Indicators for Collaborative Business Ecosystems. In H. Afsarmanesh, L. Camarinha-Matos, & A. Lucas Soares (Eds.), *Collaboration in a Hyperconnected World. PRO-VE 2016. IFIP Advances in Information and Communication Technology, vol 480* (Vol. 480, pp. 253–264). Cham: Springer. https://doi.org/10.1007/978-3-319-45390-3_22

Gunasekaran, A., & Kobu, B. (2007). Performance Measures and Metrics in Logistics and Supply Chain Management: A Review of Recent Literature (1995-2004) for Research and Applications. *International Journal of Production Research*, *45*(12), 2819–2840. https://doi.org/10.1080/00207540600806513

Gurzawska, A. (2020). Towards Responsible and Sustainable Supply Chains – Innovation, Multi-stakeholder Approach and Governance. *Philosophy of Management*, *19*(3), 267–295. https://doi.org/10.1007/s40926-019-00114-z

Hall, D. C., & Saygin, C. (2012). Impact of Information Sharing on Supply Chain Performance. *International Journal of Advanced Manufacturing Technology*, *58*, 397–409. https://doi.org/10.1007/s00170-011-3389-0

Heizer, J., & Render, B. (2015). *Manajemen Operasi: Management Keberlangsungan dan Rantai Pasokam* (11th Edition). Jakarta: Salemba Empat.

Jamshidi, O., Asadi, A., Kalantari, K., Azadi, H., & Scheffran, J. (2019). Vulnerability to Climate Change of Smallholder Farmers in the Hamadan Province, Iran. *Climate Risk Management*, *23*, 146–159. https://doi.org/10.1016/j.crm.2018.06.002

Jonsson, P., & Mattsson, S. A. (2013). The Value of Sharing Planning Information in Supply Chains. *International Journal of Physical Distribution & Logistics Management*, *43*(4), 282–299. https://doi.org/10.1108/IJPDLM-07-2012-0204

Jraisat, L., Gotsi, M., & Bourlakis, M. (2013). Drivers of Information Sharing and Export Performance in the Jordanian Agri-food Export Supply Chain: A Qualitative Study. *International Marketing Review*, *30*(4), 323–356. https://doi.org/10.1108/IMR-03-2012-0056

Kementerian Pertanian Republik Indonesia. (2018). *Export-Economic Community (AEC) in 2018*. Jakarta: Kementerian Pertanian Republik Indonesia.

Kementerian Pertanian Republik Indonesia. (2023). Kementan : Petani Adalah Pelaku Utama Pembangunan Pertanian. Retrieved January 23, 2023, from https://www.pertanian.go.id/home/?show=news&act=view&id=2158#

Kumar, R., K. Singh, R., & Shankar, R. (2014). Strategy Development by Indian SMEs for Improving Coordination in Supply Chain. *Competitiveness Review*, *24*(5), 414–432. https://doi.org/10.1108/CR-06-2012-0016

Larsson, M. (2012). Environmental Entrepreneurship in Organic Agriculture in Järna, Sweden. *Journal of Sustainable Agriculture*, *36*(2), 153–179. https://doi.org/10.1080/10440046.2011.620225

Lohmer, J., Bugert, N., & Lasch, R. (2020). Analysis of Resilience Strategies and Ripple Effect in Blockchain-Coordinated Supply Chains: An Agent-based Simulation Study. *International Journal of Production Economics*, *228*, 107882. https://doi.org/10.1016/j.ijpe.2020.107882

Maertens, M., Minten, B., & Swinnen, J. (2012). Modern Food Supply Chains and Development: Evidence from Horticulture Export Sectors in Sub-Saharan Africa. *Development Policy Review*, *30*(4), 473–497. https://doi.org/10.1111/j.1467-7679.2012.00585.x

Martin, G., Martin-Clouaire, R., & Duru, M. (2013). Farming System Design to Feed the Changing World. A review. *Agronomy for Sustainable Development*, *33*, 131–149. https://doi.org/10.1007/s13593-011-0075-4

Miguel, P. L. de S., & Brito, L. A. L. (2011). Supply Chain Management measurement and its influence on Operational Performance. *Journal of Operations and Supply Chain Management*, *4*(2), 56. https://doi.org/10.12660/joscmv4n2p56-70

Misni, F., & Lee, L. S. (2017). A Review on Strategic, Tactical and Operational Decision Planning in Reverse Logistics of Green Supply Chain Network Design. *Journal of Computer and Communications*, *5*(8), 83–104. https://doi.org/10.4236/jcc.2017.58007

Mukti, G. W., Kusumo, R. A. B., & Pardian, P. (2017). Orientasi Kewirausahaan Petani Brokoli Skala Kecil Dalam Menghadapi Permintaan Pasar Tekstur (Studi Kasus Di Gapoktan Lembang Agri Kecamatan Lembang Kabupaten Bandung Barat). *Paspalum: Jurnal Ilmiah Pertanian*, *5*(1), 15. https://doi.org/10.35138/paspalum.v5i1.33

Nakandala, D., Samaranayake, P., Lau, H., & Ramanathan, K. (2017). Modelling Information Flow and Sharing Matrix for Fresh Food Supply Chains. *Business Process Management Journal*, *23*(1), 108–129. https://doi.org/10.1108/BPMJ-09-2015-0130

Panahifar, F., Byrne, P. J., Salam, M. A., & Heavey, C. (2018). Supply Chain Collaboration and Firm's Performance: The Critical Role of Information Sharing and Trust. *Journal of Enterprise Information Management*, *31*(3), 358–379. https://doi.org/10.1108/JEIM-08-2017-0114

Papakiriakopoulos, D., & Pramatari, K. (2010). Collaborative Performance Measurement in Supply Chain. *Industrial Management and Data Systems*, *110*(9), 1297–1318. https://doi.org/10.1108/02635571011087400

Piotrowicz, W., & Cuthbertson, R. (2015). Performance Measurement and Metrics in Supply Chains: An Exploratory Study. *International Journal of Productivity and Performance Management*, *64*(8), 1068–1091. https://doi.org/10.1108/IJPPM-04-2014-0064

Rodrigues, V. S., Harris, I., & Mason, R. (2015). Horizontal Logistics Collaboration for Enhanced Supply Chain Performance: An International Retail Perspective. *Supply Chain Management*, *20*(6), 631–647. https://doi.org/10.1108/SCM-06-2015-0218

Sangwan, K. S. (2017). Key Activities, Decision Variables and Performance Indicators of Reverse Logistics. *Procedia CIRP*, *61*, 257–262. https://doi.org/10.1016/j.procir.2016.11.185

Saragih, B. (2015). *Membumikan Paradigma Agribisnis: 20 Tahun*. Jakarta: Pusat Pangan Agribisnis.

Schütz, F., Heidingsfelder, M. L., & Schraudner, M. (2019). Co-shaping the Future in Quadruple Helix Innovation Systems: Uncovering Public Preferences toward Participatory Research and Innovation. *She Ji: The Journal of Design, Economics, and Innovation*, *5*(2), 128–146. https://doi.org/10.1016/j.sheji.2019.04.002

Shin, N., Park, S. H., & Park, S. (2019). Partnership-based supply chain collaboration: Impact on commitment, innovation, and firm performance. *Sustainability (Switzerland)*, *11*(2), 449. https://doi.org/10.3390/su11020449

Shu, H. S. (2012). The Relationship Between Learning Orientation And Business Performance And The Moderating Effect Of Competitive Advantage: A Service Organization Perspective. *The Journal of Human Resource and Adult Learning*, *8*(2), 42–49.

Simatupang, T. M., & Sridharan, R. (2005). The Collaboration Index: A Measure for Supply Chain Collaboration. *International Journal of Physical Distribution and Logistics Management*, *35*(1), 44–62. https://doi.org/10.1108/09600030510577421

Simatupang, T. M., & Sridharan, R. (2008). Design for Supply Chain Collaboration. *Business Process Management Journal*, *14*(3), 401–418. https://doi.org/10.1108/14637150810876698

Srinivasan, M., Mukherjee, D., & Gaur, A. S. (2011). Buyer-Supplier Partnership Quality and Supply Chain Performance: Moderating Role of Risks, And Environmental Uncertainty. *European Management Journal*, *29*(4), 260–271. https://doi.org/10.1016/j.emj.2011.02.004

Stefanovic, N., & Stefanovic, D. (2011). Supply Chain Performance Measurement System Based on Scorecards and Web Portals. *Computer Science and Information Systems*, *8*(1), 167–192. https://doi.org/10.2298/CSIS090608018S

Susanto, E., & Othman, N. A. (2021). The Factors Influencing Modeling of Collaborative Performance Supply Chain: A Review on Fresh Produce. *Uncertain Supply Chain Management*, *9*(2), 373–392. https://doi.org/10.5267/j.uscm.2021.2.005

Susanto, E., Othman, N. A., Rahayu, S. T., Dzakiyullah, N. R., Handayani, E., Gunawan, S., & Hadiguna, R. A. (2022). Mediation effect of collaborative performance system on fresh produce supply chain performance with a lateral collaboration structure model. *Uncertain Supply Chain Management*, *10*(4), 1147–1160. https://doi.org/10.5267/j.uscm.2022.8.012

Tai, Y.-M. (2011). Perceived Value for Customers in Information Sharing Services. *Industrial Management and Data Systems*, *111*(4), 551–569. https://doi.org/10.1108/02635571111133542

Taticchi, P., Garengo, P., Nudurupati, S. S., Tonelli, F., & Pasqualino, R. (2015). A Review of Decision-Support Tools and Performance Measurement and Sustainable Supply Chain Management. *International Journal of Production Research*, *53*(21), 6473–6494. https://doi.org/10.1080/00207543.2014.939239

Tsai, K. H. (2009). Collaborative Networks and Product Innovation Performance: Toward A Contingency Perspective. *Research Policy*, *38*(5), 765–778. https://doi.org/10.1016/j.respol.2008.12.012

Zeng, S. X., Xie, X. M., & Tam, C. M. (2010). Relationship Between Cooperation Networks and Innovation Performance of SMEs. *Technovation*, *30*(3), 181–194. https://doi.org/10.1016/j.technovation.2009.08.003