RESEARCH ARTICLE Asian Journal of Dairy and Food Research, Volume 44 Issue 4: 562-567 (August 2025)

Supply Chain Partnerships and Competitive Advantage of the Beef Cattle Industry: Evidence from Indonesia

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10.18805/ajdfr.DRF-482

ABSTRACT

Background: In developing countries such as Indonesia, the increasing demand for beef has not been matched by domestic beef production. The gap between beef demand and supply highlights the low competitive advantage of the beef industry, primarily due to partnership issues within the supply chain. The objective of this study is to examine the relationship between supply chain partnerships and competitive advantage in the beef cattle industry.

Methods: The research was conducted in key beef cattle regions of Indonesia, specifically in South Sulawesi, as the regencies of Bulukumba, Sinjai and Bone. A survey questionnaire was administered to 100 respondents. Spearman's correlation coefficient analysis was utilized to test the hypotheses.

Result: The results indicated that strategic supplier partnerships had a significant and positive relationship with the competitive advantage of beef cattle. However, the sharing of market information and technological knowledge in beef cattle production was not significantly associated with the competitive advantage of the industry. Based on these findings, the study presents several theoretical and policy implications.

Key words: Beef cattle, Competitive advantage, Knowledge sharing, Market information sharing, Supplier partnership.

INTRODUCTION

Indonesia has a very high potential for beef cattle and the most widely kept are local beef cattle (*Bos sondaicus*) with 4.8 million heads. The beef cattle population is spread throughout Indonesia, with the largest number found in South Sulawesi; in 2021, it reached 1 4 million heads (Directorate-General of Animal Husbandry and Health, 2022). These local beef cattle have good genetic potential and are profitable for consumers because of the high carcass proportion and meat quality according to market needs and desires (Purwanto *et al.*, 1990).

The need for beef in Indonesia is currently increasing. In 2021, it was estimated that the need for beef will increase by almost 706, 388 tons, or the equivalent of 3.6 million heads of cattle. However, domestic beef production only amounts to 415,930 tons per year (Directorate-General of Animal Husbandry and Health, 2022). The gap between demand and supply of beef reflects the low competitive advantage of beef cattle in Indonesia. Hugos (2011) and Fanggidae *et al.* (2023) explain that activities in the beef supply chain are part of the process of delivering a product that was originally in the form of live animals into beef ready to be marketed from farmers to meat consumers. Various studies have attempted to identify sources of competitive advantage for companies in various industries; in these studies, supply chain management (SCM) have all been examined as potential sources of competitive advantage (Tuan *et al.*, 2022; Roy and Hazari, 2023).

Partnership is one of the most frequently debated topics in SCM literature in three decades. A partnership is defined as two or more companies coordinating and cooperating with each other through information sharing.

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How to cite this article: Palmarudi Mappigau, P., Amrawati, A.A., Kasim, K. and Nurlaelah, S. (2025). Supply Chain Partnerships and Competitive Advantage of the Beef Cattle Industry: Evidence from Indonesia. *Asian Journal of Dairy and Food Research*. **44(4):** 562-567. doi: 10.18805/ajdfr.DRF-482.

Submitted: 22-11-2024 **Accepted:** 24-05-2025 **Online:** 26-06-2025

The low competitive advantage is mainly caused by supply chain partnerships, for which coordination and connectivity between parts of the entire supply chain and integration between business actors is still low and thus SCM is not well integrated (Nyak Ilham, 2017; Mohit and Jaya, 2020). Presently, partnerships in the supply chain and competitive advantage of the beef cattle industry have become trending topics for developing countries (Jie *et al.*, 2015; Muthukumar *et al.*, 2021). Fearne (1998) stated that unbalanced partnerships can reduce the competitive advantage of beef cattle because they can cause inefficiencies in the production of raw materials, the manufacture of processed products and the functioning of the supply chain as a whole. Previous studies have identified several components of partnerships in the supply chain in the beef cattle industry, as supplier partnership strategies, market information sharing and knowledge sharing, which have a major impact on various forms of competitive advantage (Jie *et al.*, 2015; Sedyaningrum *et al.*, 2019). Therefore, the

objective of this study is to examine the relationship between supply chain partnerships and competitive advantage in the beef cattle industry.

MATERIALS AND METHODS

The research was conducted from April to December 2023 by the Department of Socio-Economics, Faculty of Animal Husbandry, Hasanuddin University in South Sulawesi Province. This province was chosen because it is the centre of beef cattle production in Indonesia, particularly three regions, namely Bulukumba, Sinjai and Bone districts. The research method used in this study was the quantitative method or survey method. According to Piboonrungroj (2012), the survey method is very popular in SCM research, which is a relatively inexpensive method for measuring SCM aspects. The survey method in this study used a combination of direct observation and interviews. The interviews were conducted face-to-face using a questionnaire as the main data source, which contains a list of questions in the form of multiple-choice questions. The respondents in this study were beef cattle farmers as well as traders who had implemented partnerships in the supply chain. These respondents illustrate the dyadic relationship in the beef cattle supply chain. Therefore, the utilized sampling techniques for the survey were purposive sampling and snowball sampling. The purposive sampling technique was used to determine beef cattle farmer respondents, who were selected based on the criteria of having participated in the supply chain for at least five years and being located in the three regencies of Bulukumba, Sinjai and Bone; 13 respondents were taken from each region for a total of 39 farmer respondents. Next, the individual beef cattle farmers who had been interviewed were asked about the local traders to whom they sold their cattle and then the local traders were asked about interregional traders to whom they sold the cattle, which resulted in 64 trader respondents in total. The main data collected through interviews were partnerships in the supply chain (as strategic supplier partnerships, market information sharing and knowledge sharing of beef cattle production technology) and competitive advantage (as low costs). Partnerships in supply chain were measured by asking respondents about the length of relationships among supply chain members, willingness to share market information and willingness to share knowledge about beef cattle production among supply chain members. Furthermore, competitive advantage was measured by asking respondents about the extent to which they could compete on the basis of low prices. Farmers and traders answered these respondent questions using a 5-point Likert scale, from 1= strongly disagree to 5= strongly agree.

Spearman correlation coefficient analysis was used in this study to analyze the relationship between partnerships in the supply chain and the competitive advantage of beef cattle. The reason for using the Spearman correlation coefficient is because the survey questions have an ordinal scale on their variables. The following is the Spearman correlation formula:

$$r_s = 1 - \frac{6 \sum d_i^2}{n (n^2 - 1)} \quad ...(1)$$

Where,

rs = Spearman correlation coefficient.

di = Difference in rank between data pairs.

n = Number of data pairs.

To interpret the level of relationship, the relationship levels according to Sugiyono (2014) were used, where 0.00-0.19 is Very Weak, 0.20-0.39 is Weak, 0.40-0.5 is Moderate, 0.60-0.79 is Strong and 0.80-1.00 is very strong.

RESULTS AND DISCUSSION

Supply chain pattern of beef cattle

At the operational level, in the beef cattle supply chain in Indonesia, there are three flow types: financial flows, commodity flows and information flows, as follows.

The flow of information on beef cattle starts with the butchers at the City of Makassar slaughterhouse, who inform interregional traders in Bone Regency of their order for beef cattle with certain prices and body weights, which constitutes information flow. After obtaining the information, the interregional traders then pass on the information to the collecting traders and brokers in Bone Regency, as well as collecting traders in Sinjai and Bulukumba Regencies, to find the beef cattle.

The flow of the beef cattle commodity starts with the farmers as cattle owners in the regencies of Bone, Sinjai and Bulukumba. Beef cattle from the farmers in the regencies are sold to collecting traders, who then sell them to interregional traders. Apart from selling to the collecting traders, the farmers in Bone Regency also sell their cattle directly to interregional traders through brokers. The beef cattle that have been purchased by interregional traders are then selected and if there are beef cattle with body weights that do not meet the standard of the order, the beef cattle are returned to the collecting traders to be raised until their body weights meet the standard. Beef cattle that have met the standard criteria are sent to the butchers at the City of Makassar slaughterhouse using a truck.

The financial flow of beef cattle starts with the butchers at the City of Makassar slaughterhouse, who pay for the beef cattle to interregional traders after receiving the beef cattle orders. Next, the interregional traders who have received payments from the butchers then pay the collecting traders, who are generally paid on credit by interregional traders. Likewise for the brokers, the interregional traders pay fees to the brokers for their services in finding farmers who will sell their beef cattle.

Motivation for partnerships in the supply chain

The motives of respondents for establishing partnerships in the supply chain, the respondents were assessed in

regard to three aspects: Competitive pressure from imported beef cattle, consumer demand for quality beef and demand for increased income from beef cattle (Table 1).

Table 1 reveals that, on average, over half of the surveyed farmers and traders (50.84%) cited this competition as their main motivation for establishing partnerships. This is followed by the desire to meet consumer demand for quality beef (26.12%) and the aim of increasing income (23.035%). The reliance on imported beef, both live cattle and frozen meat, stems from Indonesia's domestic production shortfall, leaving the nation unable to meet its beef consumption needs, as highlighted by the Directorate-General of Animal Husbandry and Health in 2022. The continued rise in imports poses a significant threat to the livelihoods of local farmers and traders, underscoring the importance of collaborative efforts to strengthen the domestic beef industry.

Analysis of partnerships in the supply chain and competitive advantage of beef cattle

The supply chain partnership relationships for beef cattle and their potentials are presented in (Table 2).

Strategic partnerships with suppliers allow organizations to work more effectively with a few critical suppliers who are willing to share responsibility for competitive success (Agus *et al.*, 2015). Table 2 shows the relationship between long-term relationships among supply chain members (strategic supplier partnerships) and beef cattle competitive advantage (low cost). Based on the Spearman rank correlation test, a correlation coefficient of 0.420 was obtained, which means that the strength of the relationship (correlation) between the strategic supplier partnership variable and the competitive advantage of beef cattle has moderate strength (closeness) because the correlation value of 0.420 is in the coefficient interval (0.40-0.59) and the relationship between the two variables is positive (unidirectional). Thus, it can be interpreted that the variables of strategic supplier partnership and competitive advantage of beef cattle are dependent on each other. Based on the output, the significance value was found to be 0.03<α 0.05, meaning that there is a statistically significant relationship between strategic supplier partnerships and competitive advantage of beef cattle, marked by the probability level P (0.03)<α(0.05). Therefore, it can be concluded that the hypothesis agrees with the research, which means that there is a significant relationship between strategic supplier partnerships and competitive advantage of beef cattle. As such, Ho is rejected and Ha is accepted. This result can be explained by the fact that strategic supplier partnerships are able to increase the competitive advantage of beef cattle (low costs), because long-term relationships between parties of the supply chain play an important role in the

Table 1: Respondent motives for partnerships in the beef cattle supply chain.

Motivational aspect	Amount	Percentage
Trader:		
1. Competitive pressure from imported beef cattle	57	59.37
2. Consumer demand for quality beef	28	29.17
3. Demand for increased income from beef cattle	11	11.46
Total	96	100.00
Farmers:		
1. Competitive pressure from imported beef cattle	11	42.31
2. Consumer demand for quality beef	6	23.07
3. Demand for increased income from beef cattle	9	34.61
Total	26	100.00

Table 2: Relationship between partnerships in the beef cattle supply chain and competitive advantage.

Supply chain partnerships	Competitive advantage	
	Spearman rank Correlation value (rs)	P-value
Long-term relationships among supply chain members (Strategic supplier partnerships)	.420*	0.03
Willingness to share market information among supply chain members (Sharing market information)	.269^{ns}.	0.124
Willingness to share beef cattle production knowledge with their perspective partners (Sharing beef cattle production technology knowledge)	.327^{ns}	0.210

**. The correlation is significant at the 0.01 level (2-tailed).

*. The correlation is significant at the 0.05 level (2-tailed).

formation of strategic networks and the orchestration of various supply chain activities, such as increasing customer demand for low costs. This result is similar to the findings of Sedyaningrum *et al.* (2019) which shows that the influence of supplier partnership strategy on supply chain performance of beef cattle has a positive direction. One of the characteristics of strategic supplier partnership is that the supplier partnership strategy is to explain two objectives of supply chain management, namely to improve overall supply chain performance and improve the performance of business actors themselves. In addition, effective supplier partnerships can also create opportunities to develop joint planning and joint problem-solving efforts among supply chain members. The study shows that customer relationship, strategic supplier partnership and integration of supply chain positively related to competitive advantage. Shiraz and Ramezani (2014) found that strategic supplier partnerships are the most important factor affecting the competitive advantage of manufacturing companies. Ding *et al.* (2013) found that supplier partnership strategy has a significant positive relationship with food quality. This finding suggests that building a supplier partnership strategy is important to improve the competitive advantage of beef cattle.

Information sharing is a vital aspect of coordination among parties in a supply chain Lotfi *et al.* (2013) stated that various types of information can be shared in the supply chain, including market information. Table 2 shows the relationship between the desire to share market information among supply chain members and the competitive advantage of beef cattle (low costs). Based on Spearman's rank correlation test, a correlation coefficient value of 0.269 was obtained, meaning that the level of strength of the relationship (correlation) between the variables of market information sharing and competitive advantage of beef cattle has a weak strength (closeness) because the correlation value of 0.269 is within the interval coefficient of (0.20-0.39) and the relationship between the two variables is positive (unidirectional). Thus, it can be interpreted that the variables of market information sharing and competitive advantage of beef cattle are dependent on each other. Based on the output, the significance value was found to be 0.124>α0.05, meaning that statistically there is no significant relationship between market information sharing and competitive advantage of beef cattle, as marked by the probability level P (0.124)>α0.05. Therefore, it can be concluded that the hypothesis does not agree with the research, which means that there is an insignificant relationship between market information sharing and competitive advantage of beef cattle and thus Ho is accepted and Ha is rejected. The lack of market information also causes product flow problems in the beef cattle supply chain; in particular, producers do not receive clear market signals to help them develop production plans based on market demand. These findings are supported by the results of the study by Rakiman *et al.* (2023) which also found that the level of information sharing did not have a significant effect on competitive advantage in the food and beverage industry in Malaysia, which was caused by opportunistic behavior by supply chain participants, together with information asymmetry, reducing the quality of informationy. Mappigau *et al.* (2015), who found that the willingness to share market information among supply chain of beef cattle members is considered important by farmers because they feel that traders do not want to share useful market information and also provide them with accurate and complete information about the market and its changes. Then, traders tend to close market information on cattle farmers. Without this information, beef cattle farmers cannot manage their livestock efficiently and cannot produce cattle according to market demand. Added by Lotfi *et al.* (2019), market information distortion has a detrimental impact on performance and is a fundamental problem faced in the supply chain.

Knowledge sharing in the supply chain thus enables partners in the chain to integrate their knowledge to develop potential competitive advantages (Hadaya and Cassiv, 2009). Table 2 shows the relationship between the desire to share knowledge of beef cattle production with perspective partners (sharing knowledge of beef cattle production technology) and the competitive advantage of beef cattle (low cost and time to market). Based on the Spearman rank correlation test, the correlation coefficient value is 0.327, which means that the strength of the relationship (correlation) between the variable knowledge sharing of beef cattle production technology and the competitive advantage of beef cattle is weak because the correlation value of 0.327 is in the coefficient interval (0.40-0.59) and the relationship between the two variables is positive (unidirectional). Thus it can be interpreted that the variable knowledge sharing of beef cattle production technology has a unidirectional relationship. 327 is in the coefficient interval (0.40-0.59) and the relationship between the two variables is positive (unidirectional), so that the variables of knowledge sharing of beef cattle production technology and competitive advantage of beef cattle are interdependent on each other. Based on the output, a significance value of 0.210>α0.05 is obtained, meaning that there is a statistically insignificant relationship between knowledge sharing of beef cattle production technology and the competitive advantage of beef cattle as indicated by the probability level P (0.210)>α (0.05). Therefore, it can be concluded that the hypothesis does not fit the research, which means there is no significant relationship between knowledge sharing of beef cattle production technology and competitive advantage of beef cattle, where Ho is accepted and Ha is rejected. This result can be explained by the fact that the lack of knowledge among beef cattle partners in the supply chain makes it impossible for partners in the chain to integrate the technological knowledge of beef cattle production and to transfer it to improve competitive advantage, find opportunities in the

market and develop advantages and yield. This result is in accordance with the research results of Rouf *et al*. (2019) which concluded that knowledge sharing among supply chain members will strengthen the current effective level of protection in inputs and outputs will greatly assist in increasing beef cattle production and thus, its competitiveness in all production systems. Hadaya and Cassivi (2009) stated that knowledge sharing in the supply chain thus allows partners in the chain to integrate their knowledge to identify opportunities in the market and develop potential competitive advantages. Effective knowledge sharing allows the supply chain to drive new product development, shorten time to market and reduce production costs. Sinha and Mishra (2023) stated that a lack of proper technological support which eventually leads to the information asymmetric in the multilayer supply chain which hinders the sustainability/ Ding *et al*. (2013) concluded that sharing of technological information has a significant effect on increasing production efficiency and improving beef quality. These findings suggest that increasing the sharing of technological information should be considered as a key innovative supply chain practice to improve the competitive advantage of beef cattle.

CONCLUSION

From the results of this study, it can be concluded that the relationship between partnerships in supply chain and the competitive advantage of beef cattle can have different relationships between dimensions: The relationship between strategic supplier partnerships and competitive advantage is significant and positive, while the relationships of market information sharing and knowledge sharing of beef cattle production technology toward competitive advantage are insignificant and positive. To build a model of competitive advantage for beef cattle, multivariate analysis is needed. Because this research was limited to the Province of South Sulawesi, similar research is needed in other areas of developing countries. This study helps beef cattle supply chain actors to understand which types of partnerships should be built based on their motivations to engage in supply chain partnerships and which partnerships have a significant influence on beef cattle competitive advantage.

ACKNOWLEDGEMENT

The authors also acknowledge all the stakeholders who participated in collecting data and providing secondary data support.

Conflict of interest

All authors declared that there is no conflict of interest.

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