

Collaboration Problems among Cattle Farmers and Traders in Bali Cattle Supply Chain: How to Improve Cattle Farmers Income

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Abstract: The aims of this study is to find roots problem of collaborative practice cause of low income of cattle farmers and determine strategy for improving the cattle farmers income in Indonesia. As many as 96 cattle farmers and 26 traders used as the sample of respondents. Data collected using interview techniques with instrument questionnaires and focus group discussions (FGD). The data collected was analyzed with a relatively important index (RII) and cause-and-effect (fish bone diagram). Results of RII analysis show that the first important rank of collaboration problem according to perception of cattle farmers was incentive alignment, while according to the traders was decision synchronization. From the focus group discussion, results of cause-and-effect analysis show that a root of the collaboration problem was decision synchronizing with incentives alignment and recommended strategy to improve income of cattle farmers were providing operational guidance to harmonize actions as well as to avoid conflict of goals and interests, implementing a value-based pricing system and forming a strategic alliance in the beef cattle supply chain. It is hoped that this study would help to improve beef cattle supply chain management in Indonesia. The study will also contribute to existing knowledge on supply chain collaboration practice in beef cattle industry

Key words: Collaboration problem • Roots causes • Supply chain • Bali cattle • Low income • Cattle farmer

INTRODUCTION

Indonesia has quite high potential on beef cattle. Data from Agricultural Census 2011 stated that beef cattle population reached 14, 8 millions head and the majority of the local breed are bali cattle (*bos sondaicus*) which amount reached 4, 8 million heads (32.31%). Bali cattle has good genetic potential and beneficial for consumer preference because they have high percentage of carcass and have meat quality as fit as the market needs (Purwanto *et al.*, 1990) [1]. Population of bali cattle spreads across the provinces in Eastern Indonesia, where the greatest number was in South Sulawesi Province, namely 1.082.173 heads (Directorate General Husbandry and Animal Health, 2012). In South Sulawesi Province, more than 90% of the bali cattle managed by smallholders (cattle farmers). Despite the bali cattle are one of the most important assets owned or managed by smallholders/cattle farmers in rural areas of the South Sulawesi Province. However, there are challenges in beef cattle

supply chain relation to the cattle farmers, cattle farmers get a lower price when they sell their beef cattle even though at the time price of bali beef on the consumer level is very high (Sukanata *et al.*, 2010) [2]. Hence, contribution of beef cattle income to farming households is small, ranged from 15% to 26%. (Hartono and Rohaeni, 2014) [3]. The small contribution of beef cattle income to farming household also reported by Ciamarra *et al.*, (2011) [4] in many developing countries, such as Bangladesh, Ecuador, Ghana, Guatemala, Madagascar, Malawi, Nicaragua, Nigeria, Nepal, Pakistan, Panama and Vietnam. This is evident showing that there is need for improving supply chain collaboration practices in order to increase cattle farmers income at developing countries, mainly in Indonesia.

Although collaboration between supply chain members in order to provide their benefits, such as revenue improve and cost reductions have emphasized in the supply chain literature (Tsai, 2006 [5]; Leat and Giha [6], 2008; Mathuramaytha, 2011 [7]). In the context of beef

cattle industry, however, the research studies on affects collaboration practice to the small cattle income are still sparse (Cox *et al.*, 2006) [8]. Many previous studies were more pay attention to the type and characteristics of collaboration practices in beef cattle supply chain (e.g, Fatahillah [9] *et al.*, 2011; Feery *et al.*, 2007 [10]; Macedo, 2009 [11]; Olivier, 2004 [12]). Further, problems to the collaboration practices in beef cattle supply chain have been also identified in the existing literature. They included that the unwillingness chain members to share information, share resources, risk share, decision synchronization, incentive alignment as problems in collaborative practices (Fearne, 1998 [13]; Huang and Sheu, 2005 [14]; Ferry *et al.*, 2007 [10]). According to Abraham *et al.*, (2011) [15], to get a comprehensive solution for a problem, the uses of problem analysis are becoming one of the strategies in order to achieve great success for an organization. Therefore, the research question was what the roots problem in collaboration practices as cause of the low income of farmers and how a strategy to improve cattle farmers' income based on the root of problem. Thus, the objective of this study was to propose the problem solving methods to improve income of cattle farmers based on strategy that addressed to causes of problem in supply chain collaboration practice.

Literature Review: Since the mid-1990s, a new concept in SCM stressed the importance of forming a collaboration between supply chain actors to provide the supply chain efficiently and effectively. (Tsai, 2006 [5]; Fu and Piplani 2004 [16]). Cao and Zhang (2011) [17] defined supply chain collaboration as a process of a partnership in which two or more companies self-organizing cooperation to planning and executing the operation of a supply chain toward a goal together and benefitting each other. Further, Barratt (2004) [18] categorizes two types of supply chain collaboration are vertical and horizontal collaboration. Horizontal collaboration refers to collaboration between actors in the same level of the supply chain, while vertical collaboration refers to the collaboration between the company and the partners who supply input (upstream collaboration) or partners who sell its products (downstream collaboration).

Matthew and Cheung (2008) [19] mentioned the benefits of supply chain collaboration, namely, first, the collaboration increases the profit sharing. Second, collaboration increasing capable from lowering the cost of company. Third, collaboration in the long run is the best

solution to develop business processes, as well as low the cost of adding the following value of the partners. According to Menter *et al.*, (2000) [20], collaboration can help to reduce risk, access complementary resources, reduce transaction costs and increase productivity. According to Tsai (2006) [5], collaboration between supply chain actors can provide more services to the customers, because of supply chain collaboration allows participants to respond quickly, product innovation, customer expectations and anticipate customer needs. A Relationship of collaboration between actors in need of trust and commitment to share the risk, knowledge and resources.

In the context of beef industry, Huang and Sheu (2005) [14] point out that compared to supply chain systems in other industries, there are some unique challenges presented in beef supply chains that has made the design of an efficient beef supply chain difficult. First, the industry consists of a large number of unorganized parties and coordination between them has been lacking. A large number of cattle farmers are dispersed across wide geographic areas, which makes coordination extremely difficult. In addition, the relationships of between segments have traditionally been adversarial in part a result of intensive negotiation over cattle prices and volatile margins over time. Second, product flow was not synchronized with market demand, cattle farmers did not receive clear economic signals to help them develop production plans based on market demand. The mismatching of supply and demand often forced cattle farmers to carry too much inventory, which resulted in significant lengthy production cycles over time and created facility utilization inefficiency. Third, unique problem in beef industry is related to information flow. Specifically, cattle farmers rarely receive information about carcass quality or consumer preferences. This is especially true when fed cattle is sold on a live-or dressed-weight basis. Without necessary information cattle farmers cannot improve feeding operations to increase cattle quality and they cannot select appropriate genetic breeds to meet market demand. The last, challenge to the beef supply chain comes from financial flow or pricing of beef, cattle farmers negotiated selling price for finished cattle with traders face to face when cattle were sold. These transactions for individuals pens of cattle were made at an average price, often termed as pricing on the-average and there were no economic incentives for producers and feeders to raise high quality cattle.

Fearne (1998) [13] stated that generally, there is five benefits that can be obtained from collaboration with the beef cattle supply chain, namely, improved market access, improved communications, higher profit margins and greater discipline. Collaboration can also provide benefits of farmers on the side of cost and value. On the cost side, guaranteed access to a high volume market not only reduces market risk but also provides opportunities for economies of scale in the production process. Improved communications should result in shorter lead times, low stock levels and reduced waste, further potential cost savings. On the value side, better knowledge of what consumers want and how they make purchasing decisions is invaluable when seeking to identify ways of differentiating meat products. Cox *et al.*, (2006) who studied how collaboration will reduce uncertainty and who will benefit from the relationship in UK beef cattle supply chain. They concluded that there two significant aspects which will affect the ability and potential for collaboration between supply chain actors. First, when we talk about supply chain collaboration in the beef industry; which chain are we talking about since there is not one supply chain with uniform demand, supply and power characteristics. Second, there may not be conducive power dynamics to encourage collaboration throughout a chain and the outcome of collaboration is unlikely to be shared equally. Depicts a supply chain dominated by a powerful actor, namely the multiple retailers, however there are varying power structures throughout this chain. Although collaboration may be possible between the multiple retailers and the processors due to the power position (buyer dominance), it may not be possible for the processors to encourage collaboration with all other actors in this chain (due to varying power). Even when collaboration is possible the fact that there are dominant parties in the chain would mean that it is unlikely that the benefits from that collaboration will be shared equally. Further, Patrick *et al.*, (2010)[21], studied roles of actors in local beef cattle supply chains in Eastern Indonesia, found that cattle farmers as a main involvement with the cattle supply chain occurs through brokers, collectors and traders. These participants play an important role in buying and selling decisions, providing price information and transport and linkage with buyers and sellers. The role of traders cannot be neglected in the cattle supply chain. In general, traders have a similar role, buying cattle either directly from farmers or through collectors (at the farm gate or the market) and transporting these cattle live to other regencies and provinces or islands. Helena and Hadi (2012) [22] reviewed in the macro

marketing policy of Bali cattle in eastern Indonesia, noted that the Bali cattle supply chain is long with many actors involved and the benefits of supply chain more dominated by traders, suppliers, collectors and butcher. Long chain supply strongly influenced ranges and marketing spatial. The cattle was sold outer islands have a longer supply chain from being sold in the local market. If the cattle was sold only in the local market, traders generally buy a cattle from collectors and then sold it to the butcher at abattoir. The cattle had been cut at the abattoir, mostly sold to retailers in the traditional market and a small portion sold in modern markets, catering, restaurant and hotel. If the cattle was sold out of province/other islands, before the cattle arrived in the market destination, it needs to pass the collector, traders among district, traders among regency and trader between provinces or island.

MATERIALS AND METHODS

This study adopted a case study approach designed to understand the problem solving strategy on the roots of collaboration problems causes of low income of cattle farmers in Bali cattle supply chain system at Bone and Bulukumba Districts. The districts are the center region of Bali cattle production in South Sulawesi Province. The population of the study consisted of cattle farmers and traders, which describe the dyadic relationship in Bali cattle supply chain. Hence, a snowball sampling technique used, where cattle farmer respondents as many as 96 people determined based on Slovin formula and then, the cattle farmers respondent asked to whom traders they sold their cattle and finally we found respondent of traders as much as 26 people. Therefore, the total respondent of the study was 126 people. Questionnaire survey method was used to collect primary data, which contains a list of questions prepared for the form of multiple choice questions and the respondent is given a statement to respond with answers using 3 point Likert scale, namely important, less important and not important. Primary data collected was perception of the respondents on the collaboration problem causes of low income of cattle farmers in Bali cattle supply chains. Then, focus group discussions (FGD) conducted to validate the result of case study as well as to decide and get a consensus towards a root of collaboration problem that vital for improving income of cattle farmer. Implemented the FGD by inviting as many as 30 participant who representing the cattle farmers and the trader respondents in one day workshop. The FGD is often used as an exploratory technique (Ahmad *et al.*, 2012) [23] and appears to be an

important determinant of actors motivation and consensus to word improve beef cattle supply chain collaboration (Patrick *et al.*, 2010). The problem of supply chain collaboration with this study associated with collaboration dimensions of Cao and Zhang (2011), i.e information sharing, goal congruence, decision synchnrization, incentive alignment, risk sharing, sharing resources, joint activity, joint communication and joint knowledge creation. Finally, the cattle farmers income indicator in this study is the average cash incomes received by cattle farmers from selling their cattle for the last two years .

The relative importance index (RII) method used to find cattle farmers and traders perceptions on collaboration problem cause of the low income of cattle farmers. The RII was computed as (Enshassi *et al.*, 2009)[24]:

$$\text{Relative importance/difficulty index} = \frac{\sum w}{AN} \quad (1)$$

where w is the weighting given to each factor of the respondents, ranged from 1 to 5, an is the highe'st weight(i.e. 5 in the study) and N is the total number of samples. Based on equation (1), the relative importance index (RII) can be calculated ranging from 0 to1s. Furthermore, the finding from the case study (result of RII and their rank) are validated in FGD with applying cause-and-effect analysis (fish bone diagram). The analysis is also used to find a root of collaboration problems. Then, the root of collaboration problems used to determine strategy for improving income of cattle farmers. The deciding process to find the root of collaboration problem with fish bone diagrams done by using 5 why methods.

RESULT AND DISCUSSION

The relative importance index and rank of each collaboration problem shown on Table 1. From Table 1 shows that among all collaboration problems, the third rank was most important problems according to the perception of cattle farmers as:

- Incentive alignment with RII = 0.84. Incentives alignment is considered important by cattle farmers, because they perceived that the traders were not willing to share the profits and did not provide price incentives or material rewards if farmers produced high quality beefs.

Table 1: Relative importance index and Rank For Collaboration Problem Cause of Low Income of Cattle Farmer

Collaboration Problems	Cattle Farmers		Traders	
	RII	Rank	RII	Rank
Information sharing	0.79	2	0.48	8
Goal congruence	0.60	6	0.85	3
Decision synchronization	0.75	3	0.96	1
Incentive alignment	0.84	1	0.68	4
Risk sharing	0.65	4	0.56	6
Joint activity	0.55	8	0.49	7
Joint communication	0.63	5	0.86	2
Joint knowledge creation	0.58	7	0.57	5

Source: Mappigau *et al.*, (2014)

- Information sharing with RII =0.79. Information sharing is considered important by the cattle farmers, because they perceived that the traders did not want to share useful information and also, provided them accurate and complete information about market and changes. Then, the traders tend to close the markets information on the cattle farmers. Without the information, cattle farmers could not efficiently manage their cattle and could not produce finish cattle in accordance with market demand, both from the aspect of quantity and quality
- Decision synchronization with RII = 0.75. Decision synchronization is considered important by the cattle farmers, because they perceived that the traders never involved them in making decisions about how to save on the supply chain cost and to predict market demand

In connection with the findings above, Mussell and Gooch (2008) [25] argued that improving information sharing and incentive alignment are very important factor to initiate collaboration between actors in the supply chain of agricultural commodities. The finding are also supported by previous reserach, Leat and Giha (2008) examines the challenges of building collaboration among actors of beef cattle supply chain in Scotland, found that a low level of trust of farmers and other chain actors, especially anything to do with the incentive alignment. Palmer (1996) [26] examined the beef cattle supply chain collaboration with the UK found that to encourage cattle farmers to develop relationships to other supply chain actors. They can assess and provide the right products, consistent beef quality. It is believed that cattle farmers should form the structure of the group and then integrated it with the traders to develop a supply chain management, build commitment and communication continuously as a key factor to develop effective collaboration.

On the other hand, the third rank of most important collaboration problems according to perception of traders as:

- Decision synchronization with RII = 0.96. Decision synchronization is considered important by the traders, because they perceived that the cattle farmer was difficult to work together with the traders in developing expected market demand, the cattle farmers did not interest to develop their number cattle owned even though market demand for beef cattle was promising
- Joint communication with RII = 0.86. Joint communication is considered important by the traders, because they perceived that the cattle farmer had less such initiatives to communicate with the traders and communication with cattle farmers was very difficult to open up
- Goal congruence with RII = 0.85 . Goal congruence is considered important by the traders, because of they perceived that the cattle farmers difficult to work together with traders towards their common goal in beef cattle supply chain, due to the traders activity ware market and profit oriented, while the cattle farmers in keeping cattle ware as a part-time activity and a way of investing or saving money.

The findings above supported by Kohli and Jensen (2010) [27] who mentioned that the joint communication and goal congruence are believed to be the most important element for a successful collaboration in the supply chain. According to Ahmad and Ullah (2013) [28], decision synchronization and joint communication have been considered as a tool for operating collaborative supply chain management effectively and efficiently. Added by Schroeder and Kovanda (2003) that an important factor in building collaboration among actors in the supply chain beef cattle is improving coordination, have the same goals and build communication.

From the results of case studies, it seems there are differences perception among cattle farmers and traders to the collaboration problems. To overcome the difference, FGD undertaken to validate results of the case study (RII and their ranks) as well as decide the root of the problem collaboration that vital for increasing cattle farmers income. Figure 1 presents cause and effect diagram (fish bone diagram) depicts the root of collaboration problems for increasing cattle farmers income [29].

The results of cause and effect analysis as described on Figure 1 above shows that the groups participant agreed that a root collaboration problem cause of the low income of cattle farmers was decision synchronizing with incentives alignment. There were two opinion of participant group that support on the root of the collaboration problem. One of the group participant argued that the non-transparent decision is cause of difficulties the cattle farmers and the traders to share information and financial benefits. While the other one of group participant argued that the decision synchronization and incentives alignment become an integral part of the sharing of information. Hence, limitation information access of the cattle farmers has created uncertainty for them to increase a number of cattle can be produced and their ability to maximize cattle sale price. This finding supported by Fearne (1998) who stated that the decision synchronization and incentives alignment in the beef supply chain collaboration provides benefits to farmers from the financial side. The financial benefits can be a cost-saving controller (deliver cost savings) and increase revenue or a combination of both. Previous research also supported the finding, Mathuramaytha (2011) examined the consequent of supply chain collaboration on organizational performance and found that decision-synchronization and incentive alignment has a positive effect on the performance of the organization (e.g revenue improvement and cost reduction). Here it appears that the actors of the supply chain will be able to receive the benefits of collaboration if there is a link between joint decision and incentives alignment [30]. Sridharan and Simatupang (2009) examined the relationship between supply chain collaborative practice and operational performance of the New Zealand companies and their findings suggest that decision synchronization and incentive alignment are important determinants of operational performance. In decision synchronization chain enables the chain members to reassign decision rights in order to be able to identify exceptions and make effective decisions like stocking, distribution, outsourcing and shipping, there by providing responsibilities for improving the performance of the supply chain. Incentive alignment encourages the chain members to pursue mutual strategic objectives that yield better profits to all members through sharing costs, benefits and risks [31].

For decision synchronizing with incentives alignment improvement, the groups of participants propose some strategic. The first proposal is intended for improving

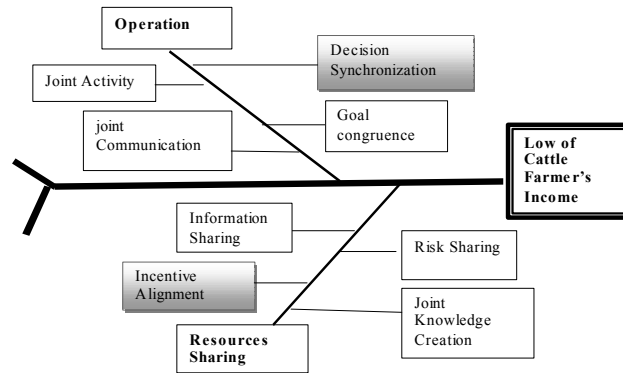


Fig. 1: Fish Bone Diagram For A Root of Collaboration Problems In Increasing Cattle Farmers Income
Source: Mappigau *et al.*, (2014)

synchronization decision through setting rules to provide operational guidance for cattle farmers and traders to harmonize their actions and to avoid conflict between the goals and interests of them. Joint decisions making between cattle farmers and traders will develop trust and communication between them to reduce costs and increase revenue. The second proposal is intended for improving incentives alignment by implementing a value-based pricing system, such as the provision of a premium price to encourage cattle farmers to produce high quality bali cattle. Furthermore, the third proposal is intended for improving both synchronization decision and incentives alignment by forming a strategic alliance that has been successfully applied in non-agricultural industry supply chain to make effective decision as well as to reduce costs and share the benefit [32].

CONCLUSSION

The relative important index (RII) analysis identified that the first rank of the most important of collaboration problems causes the low income of cattle farmers, according to the cattle farmers perception was incentive alignment. While according to the traders perception was decision synchronization. Due to the there was a different perception between the cattle farmers and the traders, therefore. the FGD conducted to validate the case study. Result of the case sudy validation and the cause and effect analysis showed that a root of collaboration problems was decision synchronizing and incentives alignment. The recommended strategy to improve the root of collaboration problem cause of low income of cattle farmers were: providing operational guidance to harmonize actions as well as to avoid conflict of goals and interests, implementing a value-based pricing system and forming a strategic alliance in the beef cattle supply chain.

It is hoped that this study would help the cattle

farmers and traders of bali cattle in formulating guidelines for supply chain collaborative practice. For local government, the result of this study would give important information as a basis for policy making in improving bali cattle supply chain management.

REFERENCES

1. Purwantara, B., R.R. Noor, G. Andersson and H.R. Martinez, 1990. Banteng and bali cattle in Indonesia: Status and Forecasts, 2012, *Reproduction in Domestic Animals*, 47(1): 2-6.
2. Sukanata, I.W., N. Suparta, K.W. Parimartaha, I.W. Budiartaha and Suciani, 2013. Strategi to increase marketing efficiency in beef cattle farmers group "Mekar Jaya" in the village of Puhu-Payangan, *Udayana Serving*, 12(1): 5-9.
3. Hartono, B. and E.S. Rohaeni, 2014. Contribution to income of traditional beef cattle farmer households in Tanah Laut Regency, South Kalimantan, Indonesia, *Livestock Research for Rural Development*, 26(8).
4. Ciamarraa, U.P., L. Tasciottib, J. Ottec and A. Zezzad, 2011. Livestock assets, livestock income and rural households Cross-country evidence from household surveys, *ESA Working Paper No. 11-17 July 2011*, Agricultural Development Economics Division Food and Agriculture Organization of the United Nations, URL: www.fao.org/economic/esa.
5. Tsai, Y.L., 2006. Supply chain collaborative practices, 12th International Federation of Purchasing and Supply Management (IFPSM), Salzburg.
6. Giha, C.R. and P. Leat, 2008. Collaborative supply chain initiatives as devices to cope with income variability in the Scottish red meat sector, Paper presented at the 108st EAAE Seminar 'Income stabilization in a changing agricultural world: policy and tools', Warsaw, Poland, pp: 8-9.

7. Mathuramaytha, C., 2011. Supply chain collaboration, What's an outcome? A heoretical model, International Conference on Financial Management and Economics PEDR, IACSIT Press, Singapore, 11: 102-108
8. Cox, A., D. Chicksand and M. Yang, 2006. Collaboration in the red meat Industry: Understanding power,demand and supply characteristics in beef supply chains, 22nd Industrial Marketing and Procurement (IMP) Conference, Milan.
9. Fatahilah, Y.H., Marimin and Harianto, 2010. Analysis of the performance of beef cattle agribusiness: A case study on PT Kariyana Gita Utama, Jakarta, Journal of Agricultural Industrial Technology, 3: 193-205.
10. Ferry, J., K. Parton and R. Cox, 2007. Supply chain practice, supply chain performance indicators and competitive advantage of Australian beef enterprises: A conceptual framework, URL: ideas.repec.org/p/ags/aare07/10116.html.
11. Macedo, L.O.B., 2009. Governance and coordination in Brazilian beef alliances: An analysis based on transaction cost and relational Approaches. VII International PENZA Conference, Sao Paulo, Brazil.
12. Olivier, G.C., 2004. An Analysis of the South African beef supply chain: from farm to fork, Magister Thesis, Rand Afrikaans University, November 2004, URI: <http://hdl.handle.net/10210/296>.
13. Ferne, A., 1998. The evolution of partnership in the meat supply chain: Insights from the British beef industry, supply chain management: An International Journal, 3(4): 214-231.
14. Huang, B.W. and C. Sheu, 2005. Devising an efficient beef supply chain: Alignment of product and functions, The 10th Annual Conference of Asia-Pacific Decision Sciences Institute, Organized by Yuan Ze University and Chinese Decision Sciences Institute at the Grand Hotel, Taipei, Taiwan.
15. Abraham, D.W., E.W. Dereje and L.C. Ing, 2011. Fishbone diagram approach for improving the passing rate for basic engineering subjects. Proceedings of the International Conference on Teaching and Learning in Higher Education, Miri Sarwak, Malaysia, pp: 25-26.
16. Fu, Y. and R. Piplani, 2004. Supply-side collaboration and its value in supply chains, European Journal of Operational Research, 152: 281-288.
17. Cao, M. and Q. Zhang, 2011. Supply chain collaboration: Impact on collaborative advantage and firm performance. Journal of Operations Management, 29: 163-180.
18. Barratt, M., 2004. Understanding the meaning of collaboration in the supply chain, supply Chain Management: An International Journal, 9(1): 30-42.
19. Matthew, B.M. and M.S. Cheung, 2008. Sharing global supply chain Knowledge, Sloan Management Review, 49: 67-73.
20. Mentier, J.T., J.H. Foggin and S.L. Golicic, 2000. Collaboration: The enablers, impediments and benefits. Supply Chain Management Review, 5(6): 52-58.
21. Patrick, I.W., G.R. Marshall, I.G.A.A. Ambarawati and M. Abdurrahman, 2010. Social capital and cattle marketing chains in Bali and Lombok, Indonesia, the Australian Centre for International Agricultural Research (ACIAR), technical reports No. 74.
22. Helena, J.P. and P.U. Hadi, 2012. Dynamics and product marketing policy of cattle in eastern Indonesia, agricultural policy analysis, 10(4): 361-373.
23. Ahmad, R., Z. Yunos, S. Sahib and M. Yusoff, 2012. Perception on cyber terrorism: A focus group discussion approach, Journal of Information Security, 3: 231-237.
24. Enshassi, A., S. Mohamed and S. Abushaban, 2009. Factors affecting the performance of construction projects in the Gaza Strip, Journal of Civil Engineering and Management, 15(3): 269-280.
25. Mussell, A. and M. Gooch, 2008. Case Studies on Agri-Food Value Chain Collaboration, George Morris Centre And Value Chain Management Centre, URL: www.fao.org/.../FAO_AAACP_Paper_Series_No.
26. Palmer, C.M., 1996. Building effective alliances in the meat supply chain: lessons from the UK, Supply chain management: An International Journal, 1(3): 9-11.
27. Kohli, A.S. and J.B. Jensen, 2010. Assessing effectiveness of supply chain collaboration: An empirical study. Supply Chain Forum: An International Journal, 11(2): 2-16.
28. Ahmed, S. dan and A. Ullah, 2012. Building supply chain collaboration different collaborative approach, Integral Review-A Journal of Management, 5(1): 8-21.
29. Directorate General Husbandry and Animal Health, 2012. Final release for data collection results of beef cattle, Dairy cattle and buffaloes (PPSK) on 2011. URL: aini-online.org/.../30-rilis-akhir-ppsk-2011-kementan.

30. Bose, K.T., 2012. Application of fish bone analysis for evaluating supply chain and business process-A case study on the ST James Hospital, International Journal of Managing Value and Supply Chains (IJMVSC), 3(2): 17-34.
31. Evans, J.R. and W.M. dan Lindsay, 2007. An introduction to six sigma and process improvement, Penerbit Salemba Empat, Jakarta.
32. Mappigau, P., Hastang, A. Asnawi and S. Kadir, 2014. Collaboration supply chain model to improve business performance and competitive advantage of beef cattle: Case of small cattle farmers in bali cattle production center at South Sulawesi, Indonesia, BOPTN Research Reports, Institute for Research and Community Services, Hasanuddin University, Makassar.