

Towards a grounded view of collaboration in Indian agri-food supply chains

A qualitative investigation

Shikha Aggarwal and Manoj Kumar Srivastava
Management Development Institute, Gurgaon, India

Collaboration
in Indian
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Abstract

Purpose – The purpose of this paper is to understand the process and role of supply chain collaboration in Indian agri-food industry and highlight the perceptions of buyers and suppliers toward each other. The paper seeks to find out how can collaboration in agri-food supply chain lead to low wastage and better efficiency. Also, the paper attempts to capture the nuances of collaborative practices and perceptions of buyers and suppliers toward collaboration.

Design/methodology/approach – Case study methodology in a top Indian food processing firm was conducted to explore the application and benefits of collaboration in supply chains. In-depth interviews with upstream supply chain members were conducted to understand the process of supply chain collaboration. Grounded theory methodology was used to analyze the transcripts.

Findings – First, through content analysis of interview transcripts a comprehensive framework and a generic model was derived to understand the process of supply chain collaboration. Supplier selection, joint planning and information sharing were found to be main antecedents while profits; waste reduction and supply chain efficiency were major outcomes of collaboration. Second, it was found that the suppliers are usually more skeptical of the buyers and do not trust them easily. While, for buyers, it is very important to have good relations with suppliers and should make provide incentives to suppliers for collaboration.

Originality/value – To the best of the knowledge, this is the first study to elaborate the process and outcomes of collaborative activities along an Indian agri-food supply chain through in-depth qualitative study. In developing countries, agriculture industry is the backbone of economy. Therefore, the insights developed in this study may be useful for managers in agribusiness to dwell into such supply chain practices that would increase profit and efficiency, and decrease wastage.

Keywords Grounded theory, Agri-food industry, Case study methodology, Supply chain collaboration

Paper type Research paper

1. Introduction

Agriculture has been the backbone of many developing nations and employs majority of a country's population, but inefficiencies in agri-food supply chains, lead to spoilage and wastage. For better productivity, mutual benefits and long-term relationships, managers are inclined toward collaboration with their supply chain partners (Stank *et al.*, 2001; Horvath, 2001; Attaran and Attaran, 2007, etc.). Since the past two decades, supply chain collaboration has been gaining increased attention of both, researchers and practitioners (Whipple and Frankel, 2000; Simatupang and Sridharan, 2002). Researchers in the past have discussed various dimensions of collaboration, such as information sharing, incentive alignment, decision synchronization and goal sharing (Whipple *et al.*, 2002; Barratt, 2004; Simatupang *et al.*, 2002). However, there is a paucity of research on the detailed process of elaborating the supply chain practices that lead to collaboration, perspectives of the collaborating parties and benefits of collaboration.



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Various conceptual and empirical studies on collaborative supply chain show that collaboration with suppliers, leads to better firm performance (Cao and Zhang, 2011; Sanders and Premus, 2005; Stank *et al.*, 2001; Vereecke and Muylle, 2006, etc.). Drawing on the positive aspect of collaboration, this study explores the concept in the context of the agri-food industry to understand how collaboration in an agri-food supply chain can lead to more efficient practices. Earlier researchers who have attempted to study the phenomenon in detail (Boddy *et al.*, 2000; Akkermans *et al.*, 2004) mention that it is a complex process and is not easy to develop cordial relations with the supply chain members (Sanders and Premus, 2005; Fu and Piplani, 2004). In this study, through qualitative methodology, an attempt is made to develop a comprehensive framework for supply chain collaboration by identifying the nuances of key collaborative activities and specific performance outcomes.

The study is based on empirical data collected from Indian agri-food industry, which is characterized by distinct features like perishability of product, demand uncertainty, raw material price fluctuations, high dependence on weather conditions, etc. (Yanes-Estévez *et al.*, 2010). Most of the studies on supply chain collaboration focus on multi-national companies (Cadilhon *et al.*, 2005). Indian agri-food sector is mainly dominated by small- and medium-scale enterprises (SMEs).

This study investigates how a collaborative relation may help mitigate losses and inefficiencies. A study on collaboration in agri-food supply chains by Leat and Revoredo-Giha (2008), showed perception of farmers about customers. This study extends further to understand which activities that each member of the supply chain should adopt to attain an overall improvement.

Specifically the objectives of this research are:

- (1) to provide insights about the process of collaboration in agri-food sector;
- (2) to understand the application and benefits of supply chain collaboration in agri-food sector; and
- (3) to compare the perspectives of buyers and sellers toward collaboration.

This paper is organized as follows. Section 2 gives an overview of Indian agriculture and agri-food industry. Section 3 outlines past research on supply chain collaboration. Section 4 explains the methodology that was followed. Section 5 discusses the findings of the research. Section 6 outlines the conclusion followed by limitations and future scope in Section 7.

2. Agri-food sector in India

According to the Ministry of Agriculture, India, about two-thirds of Indians are one way or the other engaged in agriculture. India is a leading producer of many an agricultural commodity. In 2011, India had quite a large and diversified agricultural sector that accounted for around 10 percent of total export earnings. Because of its strategic and economic significance, agriculture has been an important focus area for researchers and policy makers. In India, it plays an important role for the livelihood of people. India's economy is largely agriculture dependent. According to the ministry of food processing industries, in India, around 52 percent land is fit for cultivation. Every year, around 65 million tons of fruits and 130 million tons of vegetables are produced in India. Also, with a production of 115 million metric tons a year, India is the largest producer of milk. Small and medium holders dominate farming in India. India's marginal, small and semi-medium land holdings of around four hectares comprise

95 percent of total holdings. Average size of an operational farm in India has come down significantly over the past decades. Recently, there have been many attempts by corporates to link farmers with the markets.

Agri-foods are the agricultural products designed for human consumption (Ahumada and Villalobos, 2009). Agri-food supply chain is very complex as it involves perishable goods and a number of small stakeholders and intermediaries. In India, infrastructure that connects these numerous small stakeholders such as the farmers, wholesalers, processors and manufacturers, retailers, etc., is very weak. Farmers bring whatever they have produced to the market without actually having any knowledge about the real demand in the market. The supply chains are highly fragmented which hinders common planning and ability to make necessary adjustments in the system.

Most of the land holdings are very small- with an average of around a couple of acres. As properties are passed down they further shrink because they are divided among children in subsequent generations. Due to this, it becomes difficult for small farmers to be able to invest in new technology, equipment and infrastructure. In agri-food industry, there is a growing need for establishing better practices that would enhance the productivity and efficiency. A lot of wastage in agri-food sector occurs at the upstream supply chain, once packaged, the shelf life of (processed) food increases, and is insulated from the impact of weather or monsoons, etc. This study attempts to understand how should managers collaborate with supply chain partners reduce wastage to reduce to wastage and inefficiencies in agri-food supply chains.

3. Review of literature

3.1 Supply chain collaboration

According to the Council of Supply Chain Management professionals has “Supply Chain Management encompasses the planning and management of all the activities involved in sourcing, procurement, conversion, including all other logistics management activities.” Past researchers (Mentzer *et al.*, 2001; Gibson *et al.*, 2005) have given different definitions of the supply chain as the concept evolved over the years; however, the above definition is one of the most frequently cited ones. From this definition it is quite evident that a supply chain no longer lies with an individual firm. Bowersox *et al.* (2000) states that supply chain collaboration occurs when two or more firms integrate their human, financial and/or technical resources so as to create efficient and effective business mode. Simatupang and Sridharan (2002) have defined supply chain collaboration as “two or more chain members working together to create a competitive advantage through sharing information, making joint decisions, etc., to satisfy the end customer needs from greater profitability.” Jie *et al.* (2013) showed through a study in agribusiness industry that right supply chain practices like information sharing and supplier partnerships can lead to competitive advantage.

Many studies on supply chain collaboration confirm that it increases firm performance (Simatupang and Sridharan, 2004; Squire *et al.*, 2009; McLaren *et al.*, 2002, etc.). Firms in collaborative relationships with their partners expect to enhance their outcome by joint efforts rather than working alone (Wilding and Humphries, 2006). Also, there is more responsiveness and better service levels resulting from the collaborative efforts of the companies (Holweg *et al.*, 2005; Morash and Clinton, 1998). McLaren *et al.* (2002) states that another expected benefit out of a collaborative relationship is decrease in supply chain costs, e.g. inventory costs and production costs. Also, studies have reported that success of one collaborative venture between the firms

leads to another one in future and, builds a stronger relationship (Ramanathan and Gunasekaran, 2014). Fawcett *et al.* (2012) conducted a research based on interviews to understand successes and failures in supply chain collaboration.

Few studies on supply chain collaboration were found in the Indian context. Sahay (2003) confirms through empirical research that collaboration provides a competitive edge to organizations. The results of the paper also clearly highlight that levels of involvement of buyer-suppliers vary from one industry to another. Anbanandam *et al.* (2011) conducted research in the Indian context and proposed a model to evaluate collaboration using graph theory. Ramanathan and Gunasekaran (2014) conducted an empirical research in the Indian textile industry to determine the impact of collaborative planning and decision making on success of collaboration. We could not locate any study on supply chain collaboration in Indian agri-food context.

3.2 Agri-food supply chains

Agri-food supply chains are characterized by long lead times and high supply demand uncertainties (Lowe and Preckel, 2004). Leat and Revoredo-Giha (2008) conducted a large-scale survey research among Scottish meat supply chains to understand the attitudes and experiences of farmers in marketing the produce. Ahumada and Villalobos (2009) conducted a detailed review of literature on agri-food supply chains. They found that there is a need for research on supply chain coordination and identification of those activities, which should be undertaken by supply chain participants for the overall benefit of the chain. Reynolds *et al.* (2009) conducted research in German agri-food supply chains and found that effective communication, personal bonds and collaboration between buyers and suppliers lead to enhanced sustainability. Macharia *et al.* (2013) conducted a survey at retail outlets of fresh fruits and vegetables in Kenya to demonstrate the customer orientation, which can lead to performance improvement in supply chains. Sudarevic *et al.* (2015) conducted survey research among Serbian agri-food businesses of different firm sizes capital ownership. They found that differences occurred with respect to implementation of strategies for large and small businesses.

Researchers in the past have studied food chains mainly for gaining insights to manage demand in a more efficient manner (Taylor, 2005; Taylor and Fearn, 2006, 2009). Matopoulos *et al.* (2007) conducted research on collaborative aspects of agri-food supply chains. Their study was based on a case study in Greece. Also, they mentioned that future researchers should look deeper into the benefits of supply chain collaboration. Shukla and Jharkharia (2013) conducted a literature review on research on fresh produce supply chain management. They concluded that most research is directed toward consumer satisfaction and revenue maximization. Post-harvest waste reduction, which is critical to the growth and economy of a nation, has been less researched. Supply chain inefficiencies like demand-supply mismatch, lack of forecasting, etc., were found to be major concerns. Rice supply chain structure in India is based on the traditional framework with many intermediaries at supply and distribution fronts. Despite being the second largest producer and a big consumer of rice, India fails to contribute to global business levels in this sector. This is because it faces many supply chain problems related to procurement, distribution, collaboration, etc. (Sharma *et al.*, 2013). Recent studies in agri-food supply chains conducted have explored into issues like technological advancements like Radio Frequency Identification (Costa *et al.*, 2013; Verdouw *et al.*, 2014); traceability issues (Aung and Chang, 2014); sustainability (Beske *et al.*, 2014; Fayet and Vermeulen, 2014), etc.

However, developing countries like India are facing more critical issues like wastage across food supply chains. The numbers are increasing every year and supply chain inefficiency is one of the major causes. Through this study, we explored the concept of collaboration specifically with an aim to understand how can it help to resolve these issues. Most studies on supply chain collaboration had been conducted with a focus toward demand management or performance improvement (Vereecke and Muyle, 2006; Cao and Zhang, 2011). However, for the improvement in performance one needs to understand the nuances and detailed mechanisms that take place at buyer supplier interface (Fawcett *et al.*, 2011).

3.3 Development of proposed model

Parties in a supply chain, over a span of time, realize the need and potential benefit of developing close ties with each other than mere arm's length relationship. Many a study has claimed that buyers and suppliers have hidden incentives, expectations and motivation behind developing collaborative relationships with each other (Myhr and Spekman, 2005; Kwon and Suh, 2004). Therefore, our first construct would be "motivation behind collaboration." Researchers have pointed out that collaboration hinges on the sharing of decision making and tasks such goal sharing, information sharing, providing know-how, etc. (Whipple and Frankel, 2000; Zhou and Benton, 2007; Sanders, 2008). The mode of communication has now become electronic and has led to increased options for the parties to share information timely, more frequently and accurately. However, what information is most crucial to be shared and how it impacts the other party or the overall performance is not explicit in the literature. This leads to our second construct, which is "collaborative activities." Third, collaboration is expected to bring about a positive outcome in form of monetary and non-monetary benefits to an organization. Studies have shown collaboration leads to a positive impact on the performance of firms (Sanders and Premus, 2005; Sanders, 2008; Carr and Pearson, 2002; Stank *et al.*, 2001) by testing the causal relationship through quantitative tools. We attempt to explore what are these positive outcomes in agri-food industry, and how are they beneficial to the supply chain members, hence our third and final construct would be "collaborative outcomes."

We study these constructs in the context of agri-food industry which is characterized by low shelf life and perishability of the agri-food produce (products), long durations between sowing and harvesting (production time), dependence on nature like monsoons, etc. Therefore, results of this research would also be specific to the agri-food context. Hence, on this basis we constructed our proposed model (refer to Figure 2).

4. Methodology

The research objective of this study implies that the research involves an in-depth understanding of organizational and industry dynamics. This kind of research is called "process research" (Ferlie and McNulty, 1997). Since the objective of this research is to explore the phenomenon of collaboration in Indian agri-food industry by studying the naturally occurring events, appropriate research approach here is inductive. In inductive research, specific observations are used to draw general patterns. When the focus is on processes of a phenomenon as to "how that happens" and not on the outcome or the results thereafter, it is justified to use qualitative research (Patton, 1990). Qualitative research refers to research undertaken in a natural setting through interaction with participants and observation to look into various perspectives and behaviors of

participants (Frankel *et al.*, 2005, Mello and Flint, 2009). Qualitative methodology is preferred over quantitative when problem at hand involves an understanding of personal experiences, and insights such as behaviors, human interactions and relationships in organizational settings, which are difficult to obtain through quantitative methods (Strauss and Corbin, 1998; Mello and Flint, 2009; Gephart, 2004).

It is appropriate to use qualitative methodologies such as case studies, ethnographies, event history, etc., to observe the impact of otherwise unobservable effects in a business setting (Godfrey and Hill, 1995). In organizational and social sciences, case study research is gradually gaining acceptance (Miles and Huberman, 1994; Yin, 2003). The case study research as a methodology has been recognized as an important type of research in agribusiness sector, for understanding a phenomenon and determining its application and scope (Hoskisson *et al.*, 1999).

There are some important considerations in any case-based research. The first one is about the number of cases. According to Yin (2003), it is appropriate to use single case study approach, if the single case is a representative case. The company chosen for this research is a representative organization, which follows the method of procurement of crop in a similar manner as most processing companies. Therefore, it is believed that the lessons learned from this case would be informative about the experiences of the average person in the industry. The second issue in the case study based research is the case selection criteria. A clear mention of the criteria of case selection is an indicator of the rigor of the study (Yin, 2003). A sample of ten large organizations in food processing business was shortlisted on the basis of convenience sampling. To all ten of them, e-mails were sent out, and telephonic calls were made. Four of them responded negatively due to constraints like time, and confidentiality issues and five of them did not respond at all. Hence, we focussed our research on one organization. According to Yin (2003) even a single case firm is highly valuable from the point of view of research contribution. The third issue is the development of a case study protocol that was used to collect data. In this research, a protocol was developed with an objective to understand how collaboration in agri-food industry leads to better supply chain practices. Interviews were used as the primary source of data collection (refer to Appendix 1). The fourth issue is that of analysis of data. It relates to having a theoretical hold on the data. In this study, grounded theory technique was used to analyze the interview transcripts. It is discussed in detail in the later part of the paper (refer to Figure 1).

4.1 The case study

The company is a rice-processing organization established in the year 1995 with an annual turnover of more than 200 million dollars. It is one of the leaders in the domestic

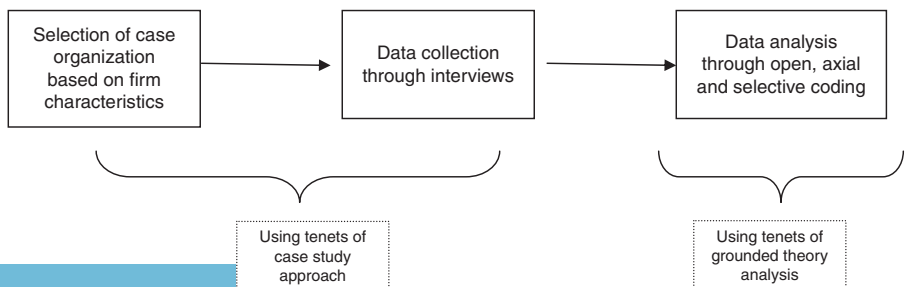


Figure 1.
Design of methodology

rice market and one of the largest exporters of Basmati rice from India. The processing unit was situated in Sonapat, Haryana, while paddy was procured from Punjab, Haryana and Uttar Pradesh.

Suppliers of paddy based out of these regions are small-scale firms. The role of suppliers is to provide the specific quantity and variety of rice as demanded by the company. For exports and even domestic market, the company needs a number of varieties of rice in different proportions and prices. Suppliers pack these crops and send it to the mill by road transport. The transport agency is booked as and when required. In some regions the company has its own trucks that operate while for others the company makes arrangements with the agencies according to the quotation of price and reputation of the transport company. The cost of transportation is borne by the company.

The crops in India are dependent on monsoon and many a time due to weather anomalies, crops get destroyed and result in high prices in the market. Suppliers might then have a chance to sell to some other party at a higher price. At that point of time, it becomes very important for an organization to have the desired quantity of raw material in time and at reasonable prices. The company considers it necessary to have reliable suppliers for smooth business. The company employs only one supplier as per a particular geographical area so that no competition is created for him by other suppliers for supplying to the organization, however, conducts an evaluation check at the end of every season for all the suppliers to make sure that the prices at which the sale was made were rightfully quoted.

4.2 Data collection

The first interview was with the head of the operations department, and went on for about an hour. Two interviews with head of logistics and of procurement division were conducted then, which lasted for 45 and 55 minutes, respectively. Then three interviews were conducted with three purchase managers of the company. Then suppliers and farmers were interviewed (refer to Table I). The organization had also provided an access to relevant internal documents that helped in refining the interview questions further.

To enhance the quality of research, data must be collected and cross-checked from multiple sources (Yin, 2003). This is perhaps one advantage of doing a case study research wherein, usually multiple sources of data is accessible and can be verified. internet, company brochures, news articles, etc., were used as secondary sources, while data collected from interviews from one member were cross-checked by asking similar questions to the other member. To check the validity and reliability, the framework suggested by Yin (2003) was used (refer to Table II).

4.3 Data analysis

We used grounded theory methodology to analyze the data. Grounded theory method is defined as “A qualitative research method that uses a systematized set of procedures to develop and inductively derive Grounded Theory about a phenomenon” (Strauss and Corbin, 1990, p. 24).

Strauss and Corbin (1997) elaborate the definition of grounded theory procedures as “a systematic analysis of selected documents, interview transcripts or notes, or other field notes by repeatedly coding and comparing the data” to produce a “well-constructed theory.” According to Yin (2003), research by exploratory case

Sl. no.	Respondents	Date of interview	Mode	Job description
1.	Head, operations	November 11, 2013	Personal	Oversees all the operations from supply chain to processing
2.	Head, logistics	November 13, 2013	Personal	Oversees transportation and storage of paddy and rice
3.	Head, procurement division	November 13, 2013	Telephonic	Oversees the procurement of paddy from Punjab, Haryana and UP
4.	Purchase Manager, Punjab	December 23, 2013	Personal	Oversees the purchase of paddy from Punjab region
5.	Purchase Manager, UP	January 11, 2014	Personal	Oversees the purchase of paddy from UP region
6.	Purchase Manager, Haryana	January 11, 2014	Telephonic	Oversees the purchase of paddy from Haryana region
7.	Supplier, Amritsar	January 11, 2014	Personal	Collects produce from farmers in Punjab and supplies to the organization
8.	Supplier, Gurdaspur	February 22, 2014	Personal	Collects produce from farmers in Punjab and supplies to the organization
9.	Supplier, Saharanpur	February 25, 2014	Telephonic	Collects produce from farmers in Haryana and supplies to the organization
10.	Supplier, Aligarh	February 26, 2014	Personal	Collects produce from farmers in UP and supplies to the organization
11.	Farmer 1	March 6, 2014	Personal	Grower of paddy in Punjab
12.	Farmer 2	March 13, 2014	Personal	Grower of paddy in Punjab
13.	Farmer 3	March 17, 2014	Personal	Grower of paddy in Haryana
14.	Farmer 4	March 23, 2014	Personal	Grower of paddy in UP

Table I.
List of respondents

Test	Tactic	Phase where it occurs	Whether incorporated in this study
Construct validity	Make use of multiple sources of evidence	Data collection	Yes
	Establish a chain of evidence	Data collection	Yes
Internal validity	Get the key informants to review draft of case study report	Compilation	Yes
	Do a pattern matching	Data analysis	Yes
	Do an explanation building	Data analysis	Yes
External validity	Address rival explanations make use of logic models	Data analysis	Yes
	Make use of theory in single case studies	Research design	Yes
Reliability	Make use of replication logic in multiple case studies	Research design	No
	Use case study protocol	Data collection	Yes

Table II.
Case study tactics for four design tests

Source: Yin (2003)

study is useful to understand the meaning and definition of constructs. Further to it, he added, “a case study is a method of empirical enquiry to investigate a phenomenon in its real life context.” Eisenhardt (1989) brought out the strengths of using case study data to build grounded theory. The two methods are consistent in a number of dimensions. In both the methods, data are obtained from natural settings; real world, and the emergent theory is derived from current managerial practices. Since grounded theory methodology is abductive in nature, it allows the exploration of “how” concepts, and supports the development of causal relationships between the constructs. Therefore, case study method serves an appropriate way to gather data for grounded theory methodology (Charmaz, 2008).

Memo-writing. An important step to increase the quality of the analytic work and to accelerate productivity was, after every interview or data collection from secondary sources, to write informal, detailed analytic notes, called memos. In grounded theory, memo-writing is considered an essential step because it sets the researcher into action to analyze the data and generate codes early enough in the research process followed (Charmaz, 2008). By memo-writing, a researcher prepares a set of analytic notes, which he can subsequently explicate and fill out the categories in it, helping him to get a feel of the data and to get more ideas about them (Charmaz, 2008). In this case, three memos were written each after going through sets of secondary data which consisted of annual reports, contracts, tenders, articles downloaded from websites, etc. and 14 memos were written, one after each primary interview. At the end of memo-writing process, a comprehensive framework outlining the process was drafted.

Coding. Coding means categorizing the data segments with a short phrase or name that summarizes the data piece by piece. A detailed view into coding shows how the data was selected, marked and sorted out to start with the analysis process. This research identified codes related to three phases: motivation behind collaboration, activities constituting collaboration and outcome of collaborative activities. Once data were collected, an initial categorization was done to identify and sort common concepts. In the Straussian approach to grounded theory analysis, three sequential kinds of coding are used – “open coding, axial coding and selective coding, where the output of one is the input to the next in a non-iterative fashion” (e.g. coding in this research, refer to Appendix 2). In the next stage, the variables from the framework developed in the first stage were further clubbed into following constructs (refer to Table III). On the basis of the themes that were generated after coding, a conceptual model was drawn (Figure 2).

Title	Perspectives of buyers	Perspectives of suppliers
Orientation/ focus	On the procurement of crop	Keen toward build good relations with the buyers
Trust	Relatively higher trust for suppliers	Generally have mistrust for the buyers
Dependence	Do not feel depended on particular suppliers	Suppliers become dependent on buyers after a few years
Power asymmetry	Buyers feel that they are in a controlling position	Suppliers, who are generally too small firms, believe buyers can switch them at any time
Rewards	Buyers do not bother about timely payments to suppliers	Suppliers consider or prefer dealing with those buyers whose payments are on time

Table III.
Summary of
comparative analysis
of buyer-supplier
perspectives

5. Discussion and findings

We have segregated our findings into three segments in alignment with our research objectives highlighted above.

5.1 Process of collaboration

Identification of the right supplier partner is of foremost importance. In order to develop long-term collaborative relationships, supplier selection should be carefully done (Choi and Hartley, 1996). A series of steps should be followed to ensure market reputation, financial position, quality compliance through review of samples, etc. Supplier evaluation is important because soft non-quantifiable criteria like commitment of suppliers have a positive impact on firm’s performance (Kannan and Tan, 2002). Next, a joint meeting with the suppliers should be conducted to provide a platform for knowledge sharing, update on technology and methods of working, etc. Then on a regular basis, information sharing from both sides should happen, such as suppliers share harvest status, price fluctuations in the market, help identify reliable and low cost transportation services in the area and food processing firms educate and train suppliers on efficient and cost-effective methods of harvest and storage, regularly update on sales and inventory status, etc. In this manner, overall reduction in costs is realized due to lower purchase price, lower transportation costs and savings through maintaining optimum inventory levels. The details are shown in Figures 3 and 4.

5.2 Application and benefits of collaboration in agri-food supply chains

For supplier selection, a rigorous background check and evaluation of the past performance of the new firms should be conducted to avoid problems related to order-fulfillment and timely order delivery. Second, quality of the crop is of great importance for export purposes. Initially, the company asked for samples of paddy from any new supplier and tested them. Third, companies would like to avoid the complexity of supplier selection time and again. This motivates companies to maintain good relations with the suppliers.

Collaborative planning helps supply chain members to better understand the dynamics of the supply chain and delivers potential benefits of supply chain collaboration (Barratt and Oliveira, 2001; Dudek and Stadler, 2005; Cassivi, 2006). To facilitate joint planning, a meeting is conducted with all the existing and newly selected suppliers, in which the future course of action is discussed. This helps both the parties understand their roles clearly and also what are the expectations of the other party. Socialization and frequent talks with suppliers is essential for development of good relationship and strong collaboration between supply chain partners (Cousins and Menguc, 2006). Also, this joint planning stage can be very effective in building trust and commitment between the two parties. Jraisat *et al.* (2013) conducted interview-based research in Jordanian agri-food supply chain and found that joint planning is an important driver for information sharing in a dyad.

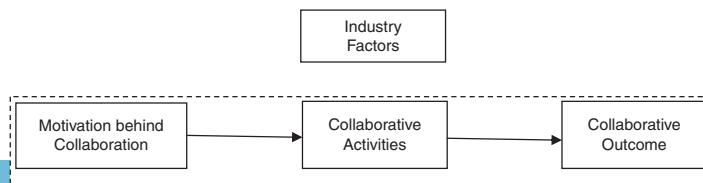


Figure 2.
Proposed conceptual model through literature review

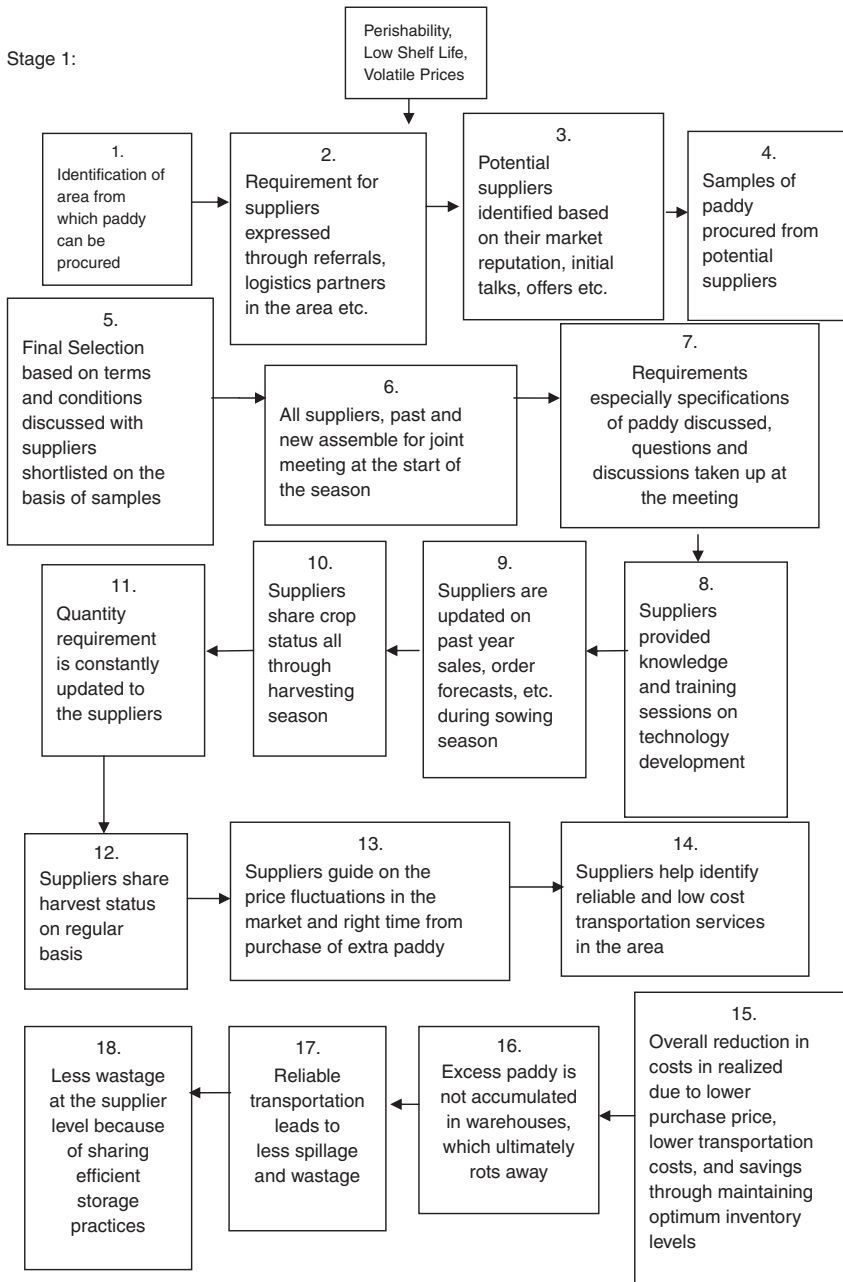


Figure 3.
Comprehensive
model for supply
chain collaboration

Both the parties share information with each other on forecasts. The information shared by food processing firms is on market forecasts, while that shared by suppliers on status of crops before and during harvesting would be helpful to both of them. Eksoz *et al.* (2014) conducted a systematic review of literature on collaborative

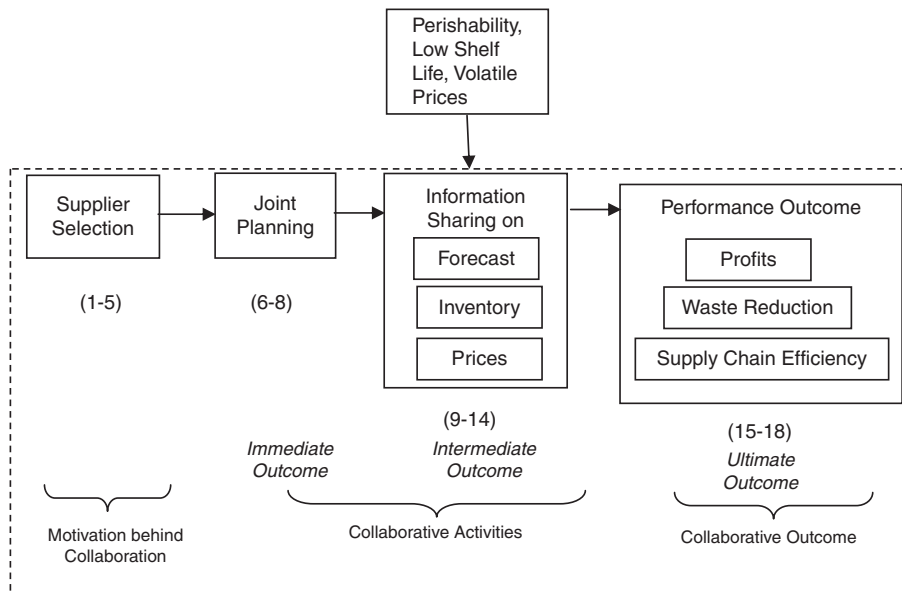


Figure 4. Conceptual framework for supply chain collaboration

forecasting in food supply chains and highlighted the importance of right information sharing between partners for efficient forecasting of seasonal and perishable products. Collaborative forecasting plays an important part in managing demand and fulfillment of orders (Ramanathan, 2012; Ho and Choi, 2014).

Information sharing on inventory, stocks held, forecasts, etc., also helps both the parties. It prevents situations of stock-outs or over stocking. Information sharing leads to better inventory management across the supply chain (Yu *et al.*, 2001). When suppliers have due information about the inventory with the buyers and the demand, they sell the excess inventory held with them in the market or alternatively purchase optimum inventory in the first place to avoid spoilage and wastage later. In an environment of dynamic prices, where the price of raw material is very important, the suppliers keep the company updated about the fluctuating prices of the crop in the market and prices of the yield. These prices are volatile and keep changing across the day. This leads to huge difference in profits depending upon whether bought at the right time or not. Due to this companies save a lot in financial terms on raw material costs, transportation, etc., which leads to increase in profits. Information sharing plays an important role to help firms from the impact of price fluctuations (Yu *et al.*, 2001; Lee *et al.*, 2004). Suppliers arrange for transportation facilities that are reliable and economical in their local area. Apparently, transportation is the most critical step in “food journey” (Manzini *et al.*, 2014). Other than that they buy the crop in bulk when prices are lower, and help buyers have a competitive edge over other organizations in terms of costs.

In India, there is a lot of spoilage and wastage in agri-food, because of poor supply chain infrastructure. In collaborative supply chains, if timely information flow happens between the two parties, it can lead to reduction of wastage in agri-food. Overall, the supply chain becomes more efficient with optimum levels of inventory, cost of transportation, timely delivery and reduced wastage.

5.3 Comparative analysis of perspectives of buyers and suppliers

The interviews with the buyer and supplier were analyzed to compare different perspectives of the two parties. Since the structure of the agri-food industry in India mainly has buyers as large organizations involved in processing while suppliers are SMEs, the perspectives of each one of them had a considerable impact on the relationship.

Perspective of buyers. The organization was focussed on the outcome. Although it was mentioned they dealt generously with the suppliers who were unable to meet the demand or in the case when the crops failed, but otherwise their focus was on the procurement of the crop:

[...] we care about our suppliers and assist them whenever they need us, but they should focus on their job and targets because poor performance from their side will directly impact the company – interview excerpt.

Buyers indulge in trust-building activities only to retain the suppliers and avoid switching costs. However, it was also mentioned that if losses occurred, they do not pass the whole burden on the supplier:

[...] he would not be able to bear it [...] it is our social responsibility to take care of these things as well – interview excerpt.

The organization focussed on building trust and commitment with the suppliers so as to avoid the complexity of monitoring the suppliers. They did not consider sharing any rewards or incentives to suppliers to maintain a good relationship:

[...] suppliers become dependent on us after a few years. It is difficult for them to find buyers who bulk-purchase – interview excerpt.

Since buyers themselves realize that suppliers over the time become dependent on buyers, their behavior toward the suppliers might not remain the same over the years. It would be interesting to do a longitudinal research on the subject to understand how the relationship between buyers and suppliers changes over a time.

Perspectives of suppliers. Suppliers, who are generally too small firms as compared to the buyers in agri-food, believe that it is very easy for the organization to find new suppliers, and that they should do their best to maintain a good relationship. They find the buyers very considerate toward them for the extra initiatives taken by the buyers:

[...] we can talk to the management if there is any issue [...] they are ready to help us whenever we need them [...] they trust us therefore, they share confidential information with us [...] they make payments on time which other competitors in the market don't do – interview excerpts.

An important element in maintaining good relationships that came up after interviewing the suppliers was timely payment. Suppliers prefer dealing with those buyers whose payments are in time, because suppliers have to pass on the money further to the farmers or workmen too. Therefore, for buyers in any industry it would be an important factor to show their commitment to the suppliers.

About the routine evaluation, the supplier believed that it was redundant because after all the years of working together, the company need not check on them:

[...] However, it doesn't matter to us, but that is mainly for new suppliers who join, with us it is nothing stringent [...] – interview excerpt.

Probably after years of working together, suppliers develop trust and commitment toward the buyers. For a summary of perspectives of buyers and suppliers, refer to Table III. The above findings from agri-food sector fall in line with researches on comparative analysis of buyer-supplier perspectives in collaboration. Buyers indulge more in developing relationship outcomes like trust and commitment while suppliers focus more on transaction-specific outcomes (Ambrose *et al.*, 2010; Nyaga *et al.*, 2010).

To develop sustainable agri-food supply chains, collaboration between supply chain members is an important factor (Attaran and Attaran, 2007; Pagell and Wu, 2009). Saving total supply chain cost, as compared to individual cost reduction will lead to energy saving and waste reduction in society. Agility in a supply chain can be achieved if members of supply chain collaborate with each other (Power *et al.*, 2001). Satisfying market requirements in the shortest possible time with due consideration to total supply chain cost, optimization through collaboration in technology, resource pooling and equipment sharing. However, at present in Indian agri-food industry these are indirect outcomes of collaborative activities. There is a need to educate managers on these fronts so that conscious and deliberate efforts to collaborate with supply chain partners are undertaken. The focus of agri-food organizations is shifting from individual to dyadic level for now. In future, it is expected to spread to chain level and network level collaboration to benefit the industry and society as a whole.

Our findings are in line with resource dependence theory, which proposes acquisition of scarce and valuable resources from outside the organization for success and survivability of organizations (Pfeffer, 1981; Salancik and Pfeffer, 1978, etc.). Also, the research is aligned with the present work on interdependence between organizations (Danese *et al.*, 2004; Cox, 2004) and extends it by identifying “how” interdependence leads to joint planning and information sharing. Most variables and their relationships exhibited in the framework as findings from the case study are in line with earlier researches conducted in other industries and countries. Information sharing on “price” has been unique in agri-food setting owing to dynamic pricing as one of the characteristics of industry. Second, waste reduction is found to be an outcome of collaborative activities, which has huge social implications. Managers at focal firms can develop programs or workshops to educate suppliers about collaborative initiatives to reduce wastage. Government can also conduct training and development initiatives for farmers and small-scale suppliers on collaborative activities and benefits.

6. Conclusion

Despite abundant literature on supply chain collaboration, there still remains a need for understanding the concept in depth and exploring the application and outcomes in different contexts. In case of agri-food industry, this research has shown that developing collaborative relations not only results in benefits for both buyers and suppliers, but also leads to better and sustainable practices in the industry. A cover from price volatility and reduced wastage, which come, as outcomes of collaborative relations between growers and processors are extremely beneficial and desirable for the country. However, suppliers are usually more skeptical of the buyers. Since, there is power asymmetry because buyers are usually large organizations whereas suppliers are small-scale ones, the latter does not trust the former easily and believe that the buyers can leave them at any point. While, for buyers, it is very important to have good relations with suppliers, because they do not want to enter into cumbersome activities of finding new suppliers for major

regions every now and then. The buyers should dwell into such activities, which would increase the confidence and trust of the suppliers.

7. Limitations and suggestions for future research

There are a few limitations in the study. First, the methodology used, that of a single case study poses challenges to the generalization of its findings. However, it is a methodological limitation, and the reader is advised to examine the findings within the contextual setting of the case. Second, the study does not make an attempt to develop any particular theory; it only tries to understand the application of a concept through real life practices.

One interesting extension of the study could be including cases from agri-food industry other than food grains such as milk, fish, vegetables, etc., and perform a multi-cases analysis to validate the above framework or a multiple case study approach could be followed.

Second, subjective measures like trust, commitment and power inequity that have been identified in the literature (Bezuidenhout *et al.*, 2012) and talked in the study for this particular case as important moderating factors for long-term collaborative relationships. An interesting study could be done by testing these variables in a longitudinal research. This research focussed only on the upstream supply chain in agri-food at the interface of a processing firm in the agri-food industry and the suppliers of this firm. A research could be conducted at the downstream level of supply chain too, whereby collaboration of the firm with its distributors or retailers could be studied to identify how collaboration impacts the upstream supply chain and whether or not it is different from the one outlined in this paper.

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Further reading

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Appendix 1. Case study protocol

Objective of research

To explore the concept of supply chain collaboration in the context of Indian agri-food industry.

Research model

Based on research questions and survey of literature following conceptual model is proposed (refer Figure 2).

Field procedures

Interviews with buyers: in the organization, first few interviews will be conducted with the managers at the company, to understand the overall supply chain and procurement process of the company. After that, an interview with the purchase managers will be conducted who deal directly with the suppliers.

Interviews with suppliers: similarly, few suppliers will be interviewed to reduce respondent bias and get different perspectives. Attempts will also be made to collect data from observation and triangulate the data by multiple sources of information.

Interviews with farmers: suppliers will be asked to refer to their respective farmers, so that the latter could be interviewed. This would give a holistic view of the situation and would help to understand suppliers, their problems, needs and expectations from the organization.

Interview questions

- (1) *Main Question:* Information about the company.
Probes: Size of the company, Business structure, Business activities, etc.
- (2) *Main Question:* Describe the industry and the practices followed and how have the industry evolved over the last few years.
Probes: Public private players, competition, infrastructure, etc.
- (3) *Main Question:* What is the structure of your supply chain? What changes have come upon from the past?
Probes: When did the business start, scale of business, growth, partners who you have worked with?
- (4) *Main Question:* Describe your relations with your suppliers/buyers.
Probes: How many years have you worked together, how the relationship developed?
- (5) *Main Question:* How has this impacted your business practices?
Probes: Impact on day-to-day activities, what role does the other partner play in planning, decision-making?
- (6) *Main Question:* What is their incentive in maintaining good relationship with you?
Probes: What do you think about their benefit from this relationship, what could be a possible reason for them to quit?
- (7) *Main Question:* What type of resources do you share?
Probes: Assets, knowledge, information, means of communicating, etc.
- (8) *Main Question:* How does this collaboration help you?
Probes: What is the impact, is it mutually beneficial, if yes, how?

Appendix 2

Categories	Total no. of excerpts	Examples of excerpts
Primary activity	45	“select the right supplier” “supplier should be able to deliver in future” “a background check of past business and a meeting is done to make sure we don’t end up trouble later”
Immediate outcome	42	“We conduct training sessions for suppliers” “Plan together” “Targets are set jointly”
Information sharing	53	“Understanding their needs and how much can they deliver” “communicate about inventory levels” “Information on number of bags” “share with them market forecasts”
Performance improvement	49	“Keep us updated on prices of the crop” “wastage is reduced substantially” “Transportation expenses come down” “both parties save at a lot of places”

Table AI.
Coding of data

BFJ
118,5

About the authors

Shikha Aggarwal is a Research Scholar at the Management Development Institute, Gurgaon, India (MDI). She is pursuing Fellow Program in Management in the area of Operations Management at the MDI. Her research interests include: supply chain collaboration, supply chain resilience, strategic sourcing, supply chain risk and disruptions. Shikha Aggarwal is the corresponding author and can be contacted at: fpm13shikha_a@mdi.ac.in

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Dr Manoj Kumar Srivastava is Area Chairperson and Associate Professor in Operations Management at Management Development Institute, Gurgaon, India (MDI). His research interests are in supply chain performance management, operations strategy, decision sciences and service operations management.

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