Power, Supply Chain Integration and Quality Performance of Agricultural Products: Evidence from contract farming in China

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Abstract

Improving the quality of agricultural products is crucial for facilitating sustainable agricultural development. One widely embraced approach is contract farming, which generates guarantees – necessary for sustaining the continuous operations of vulnerable farmers – while enabling manufacturers to manage the aggregate supply chain risks and prices. Although management researchers have investigated power and quality performance issues between organisations, few have examined their impact on contract farming. This paper extends the literature by examining the relationships between power, supply chain integration and the quality performance of agricultural products, from the perspectives of farm households and agribusiness companies in contract farming. This study proposes and empirically examines a model, applying survey data from 78 agricultural companies and 321 peasant householders in China. The results show that different types of power have different effects on contract farming. In particular, non-economic power significantly and positively affects supply chain integration. Its impact on process coordination is greater than its impact on information sharing. The effect of economic power on supply chain integration is different from the binary perspective. These findings have positive theoretical and practical significance for agribusiness and will help farmers to improve the quality of primary agricultural products and achieve sustainable agricultural development.

Keywords: Contract farming; power; supply chain integration; quality performance; binary perspective.

1. Introduction

In the context of globalisation, efforts to improve the quality of agricultural products are receiving increasing attention (Matos and Hall, 2007; Mangla et al., 2018). Notably, in most developing countries, such as China, Thailand and India, the development of agricultural products is being revolutionised more rapidly than anywhere else in the world (Zhao et al., 2008; Wang et al., 2014, Jia et al., 2018). Accordingly, contract farming is a growing practice in first world countries, as well as developing countries (Jin et al., 2015; Baluch et al., 2017). It is defined as 'a system for the production and supply of agricultural product under forward contracts with the essence of such contracts being a commitment to provide an agricultural commodity of a type, at a time and price, and in the quantity required by a known buyer' (Singh, 2002).

Studies show that contract farming is a new approach to supply chain integration that rewards all of its participants (Matos and Hall, 2007; Jin et al., 2015; Zainol et al., 2019). In particular, it offers important guarantees to vulnerable farmers, allowing them to maintain their processes and operations, which is an essential socio-economic objective in developing countries (Wang et al., 2014). In the supply chain, the relationship between companies and farmers is essentially an upstream relationship. The suppliers (farmers) supply products or resources to the buyers (companies), who purchase them according to contracts with pre-agreed prices. Key benefits of contract farming, which support its application in supply chain integration include suppliers' improved productivity and enhanced access to high-end markets, the promotion of buyers' marketing activities and increased total revenue and reduced supply uncertainty for both suppliers and buyers (Cachon and Lariviere, 2005; Lehoux et al., 2014; Moazzam et al., 2018). In addition, contract farming is a rapidly increasing practice in first world countries (Otsuka et al., 2016). Research efforts from the United Kingdom, Belgium, France, Canada, Japan and the United States all show that applying contract farming improved supply chain efficiency (Wang et al., 2014; Niu et al., 2016). For example, Wang et al. (2014) identify that contract farming can accelerate the application of new production technologies, reduce supply chain risk and improve production outcome at less expense.

Using contract farming to facilitate supply chain integration is unique to China, since it is different from general supply chain relationships in empirical studies (Yeung et al.,

2009; Liu et al., 2013). This type of one-to-many relationship between farmers and companies can be considered a collaboration between single agricultural enterprises, as legal entities, and multiple farmers, as natural persons (Fu et al., 2017). This unique relationship determines the unequal positions and power of its participants (Zhao et al., 2008). China's national culture features by collectivism and a high power distance, which makes it an extremely unique context for exploring issues associated with different types of power and contract farming for supply chain integration. Therefore, this study proposes a model to examine the relationships between types of power, supply chain integration and quality performance of agricultural products in the context of contract farming. It addresses the following questions:

Q1: How do different types of power affect the implementation of supply chain integration?

Q2: How does supply chain integration influence the quality performance of agricultural products?

To address these research questions, this study analysed contract farming, at a system level, through two independent surveys of agricultural companies and farmers influenced by agricultural industrialisation. Previous studies by Fu et al. (2013a 2013b; 2014; 2017) have proposed the existing knowledge on the implementation of contract farming in the agricultural sector by suggesting a preliminary "A company + farmers" model to facilitate supply chain management process. However, the main research objectives, data sources and approaches are different from our proposed study. More specifically, Fu et al. (2013a) introduced the preliminary 'a company + farmers' model and explored the relationships between trust, relationship commitment and information sharing through empirical testing based on the buyer's (company's) perspective. Then, Fu et al. (2013b) examined the model by studying the stability of the alliance from the perspective of the suppliers (farmers). Fu et al. (2014) further tested the model based on how agricultural firms' power affected farmers' trust and relationship commitment, as well as the social responsibilities along entire supply chains with the aim of improving productivity and reducing costs (Fu et al. 2017). In short, although these related studies conducted empirical analyses to gain a better understanding of the 'a company + farmers' model for effective agricultural supply chain management, they were focused on different aspects (e.g. trust, relationship commitment and social responsibility) from a single perspective (i.e. either from the farmers' or the companies' perspective). Thus, the effects of power on contract farming

for supply chain integration and their relationship to quality performance of agricultural products remains unknown. Accordingly, the main purpose of this research is to extend the previous work (2013a 2013b; 2014; 2017) by further recasting and augmenting the conceptual basis of the ‘a company + farmers’ model through two independent surveys of agricultural companies and farmers influenced by agricultural industrialisation. The relevance of this research comes from the direct applicability of its processes to real agricultural supply chain business problems that both farmers and companies face.

The study is organised as follows. Section 2 reviews relevant literature and proposes six important hypotheses. Section 3 illustrates the methodology applied in this study. Section 4 details the data analysis and presents the findings. Section 5 discusses the findings regarding the relationships among power, supply chain integration and quality performance of products in contract farming. Section 6 concludes the study by highlighting the implications of the research and providing directions for future study.

2. Literature review and research hypotheses

This section concerns the comprehensive study of literature surrounding types of power in contract farming and the constructs within contract farming that affect the quality performance of agricultural products. Each of these components is discussed in the following sections, with hypotheses about how they are related.

2.1. Types of power in contract farming

Power, in this context, refers to the ability of one party to influence the decision-making of another party during collaboration (Brown et al., 1995). The fundamental concept of power has been a critical theme for research in organisational behaviour (Jackson and Carter, 2007; Mast, 2010). A study by French and Raven (1959) investigated power in various empirical contexts over approximately 50 years. For example, party member A relies on advantages in information, technology and capital to influence party member B. Thus, B is compelled to act to meet A’s expectations. A is not the manager of B, but A influences B to a certain extent, which means that A uses power on B. Power is not a unidimensional concept. Etgar and Michael’s (1978) typology describes power in terms of two types, namely non-economic and economic power, which play the role of ‘carrot’ and ‘stick’, respectively, in channel relations (Zhao et al., 2008).

There are two main types of power as non-economic power and economic power. On the one hand, non-economic power refers to when a party induces another party to comply with its desired activities with an inducement method, such as the provision of favourable information and technical guidance (Maloni and Benton, 2000). For example, from farmers' perspective, the company may have knowledge and skills, such as how to plant high-quality and safe agricultural products, make new products adapted to the local environment and achieve superior production effects. This gives the company the authority to influence the farmers. In contrast, farmers may have expertise in producing better products. Thus, the company allows the farmers to do business according to the farmers' demands (as part of the relationship between farmers and companies). Most of the time, the non-economic power allows the farmers to decide whether they will be affected by a company, and how much. Farmers seek alliances with companies according to their perceptions of how a company's expertise, reputation, knowledge and technologies will affect them (Brown et al., 1995; Zhao et al., 2008).

On the other hand, economic power refers to when a party has the ability to mediate rewards or punishment to another party. For example, from farmers' perspective, the company may have the ability to offer farmers attractive incentives (e.g. advanced technical support, excellent breeding varieties, great acquisition prices or more services) and to punish or threaten the farmers (e.g. reduce or even cancel transactions, reduce transaction volumes or threaten farmers with cancelling a preferential offer). Meanwhile, farmers may also have the right to offer rewards that are beneficial to the company (e.g. the farmer can choose to provide more business to the company) or to issue punishments that are unfavourable to the company (e.g. withdraw or decrease the capacity of business with the company). However, given the fact that most of the world's farms are small and family run businesses (Lowder et al., 2016), the economic power of farmers tends to be limited. Thus, this type of power is regarded as being mediated because its adoption is mainly managed by the company, which may reward farmers by generating positive outputs (such as placing buyer orders), or punish farmers through negative outputs (such as withdrawing an order) (Etgar and Michael, 1978; Maloni and Benton, 2000). The company, as the power source, decides whether to apply its right to affect farmers' behaviour and, if so, when and how it will be applied (Fu et al., 2014).

2.2 Contract farming for supply chain integration

In terms of managing agricultural supply chains, contract farming is a type of vertical supply chain integration, which enables farmers and companies to achieve 'win-win' situations (Kirsten and Sartorius, 2002; Saenger et al., 2013). Supply chain integration refers to an across the board integration of a firm's internal functions like production, logistics and R&D, and all of the external networks, involving downstream consumers and upstream suppliers (Huo et al., 2014). Although several studies have investigated the different functional sides of supply chain integration, only a few have examined it from a contract farming perspective. Accordingly, this study integrates the supply chain integration and contract farming perspective and define the concept as the extent to which farmers and companies' external networks and internal functions operationally and strategically collaborate with each other to produce high quality of products at low costs. This is an extension of the supply chain integration concept.

Literature related to contract farming has, in the past, generally investigated the practice as a unidimensional measurement (Asokan and Singh, 2003; Barrett et al., 2012). Recent studies identify a way for measuring the effectiveness of contract farming for supply chain integration according to two criteria as process coordination and information sharing (Ariffin et al., 2015; Zainol et al., 2019). Process coordination refers to integrative activities among participants to enhance the overall supply chain efficiency, and information sharing refers to the sharing of critical information across the supply chain network (Prajogo and Olhager, 2012). Supply chain managers argue that process coordination and information sharing can result in practical supply chain efforts (Williams et al., 2013; Wong et al., 2015), but their effects on the quality performance of products in agricultural supply chains are not clear. As highlighted by Liu et al. (2015), the alleged operational advantages of supply chain integration vary significantly across studies. This divergence of research findings is associated with different assumptions and supply chain constructs, which can lead to inconsistencies wherein researchers apply the results of one situation to a different situation (Zhao et al., 2008; Wong et al., 2015).

2.3 Quality performance of agricultural products

Agricultural product quality conventionally plays an important role in nearly all agricultural businesses (Zhao et al., 2008; Mangla et al., 2018). In the light of the

consumers' increasing concerns about food quality, the degree to which firms can manage or even enhance their market competitiveness in the future will critically rely on their capability to successfully satisfy customers' requirement for high-quality agricultural products (Otsuka et al., 2016). In this study, to consistent with the supply chain integration and contract farming perspectives, quality performance of agricultural products was measured by improved product quality, improved production costs, reduced investments of fixed assets and reduced capital investments (Huo et al., 2014; Fu et al., 2017). Particularly, contract farming offers a novel approach to controlling complicated production procedures, with better performance than is possible with arm's-length transactions (Krishnan et al., 2004; Mangla et al., 2018). This leads to better product quality, more secured production and lower marketing and processing expenses (Baihaqi and Sophal, 2013; Moazzam et al., 2018). According to Wang et al. (2014), in some developing (or transition) economies, contract farming can deal with imperfections in output and input markets and organisational shortages by offering farmers market access, credit, raw materials, technology services and human capital.

Existing literature provides various analyses regarding contract farming and the performance of agricultural products in supply chains. Most studies suggest that contract farming can improve the performance of overall supply chain outputs (Krishnan et al., 2004; Alexander et al., 2007; Cachon and Kok 2010; Saenger et al., 2013; Niu et al., 2016; Moazzam et al., 2018). For example, Krishnan et al. (2004) investigated retailers' promotional efforts in collaboration contracts for decentralised supply chains. This investigation demonstrated that a buy-back contract with a promotional cost-sharing agreement can improve the overall supply chain quality. Alexander et al. (2007) performed an analysis of the US agribusiness industry and identified that contract farming improves overall product quality but that its performance can be affected by different financial incentives. Cachon and Kok (2010) investigated supply chain performance under various circumstances and suggest that downstream supply chain participants are better off in contracts, considering the presence of competing suppliers in supply chains. Chiu et al. (2011) explored how targeted sales rebate contracts can influence supply chain performance in different situations. Through studying the Vietnamese dairy industry, Saenger et al. (2013) found that contract farming practices drive farmers to greater agricultural inputs, leading to enhanced product quality. Wang et al. (2014) offer a

comprehensive review of the empirical literature on contract farming in both developing and developed countries and further confirm the positive relationship between contract farming and quality performance of products. Niu et al. (2016) explored how different contract structures could be improved—to result in a win-win situation for supply chain parties. Moazzam et al. (2018) proposed a collaborative framework for better evaluating agri-food supply chain performance.

2.4. The relationship between power and contract farming for supply chain integration

Contract farming is a novel practice of vertical supply chain integration that benefits both farmers and companies (Matos and Hall, 2007; Jin et al., 2015; Zainol et al., 2019). According to Zhao et al. (2008), supply chain integration refers to the degree to which an organisation strategically collaborates with its supply chain partners and manages intra- and inter-organisation processes to achieve effective and efficient flows of products, services, information, money and decisions, with the objective of providing maximum value to its customers. Studies of supply chain integration explicitly identify two aspects of the chain: information sharing and process coordination (Prajogo and Olhager, 2012; Zainol et al., 2016). Supply chain integration requires parties to consider both process coordination and information sharing, not only one or the other (Williams et al., 2013; Wong et al., 2015). Greater degrees of integration are achieved by facilitating the collaboration of supply chain efforts among all parties, improved communication and more blurred distinctions between the supply chain efforts of the company and those of its consumers and suppliers (Prajogo and Olhager, 2012; Liu et al., 2015). This study focuses on contract farming for supply chain integration, which refers to farmers establishing a strategic, cooperative partnership with companies and participating in their design and production process to achieve production efficiency, accelerate supply chain response and meet the needs of customers. In particular, it aims to offer insight into the value of process coordination and information sharing through various types of power.

Studies show that non-economic power enhances supply chain cooperation and promotes positive attitudes towards supply chain integration (Brown et al., 1995; Park et al., 2017). This facilitates consistency in norms and values among participants (Frazier et al. 1986; Benton and Maloni, 2005). Fu et al. (2014) identified that non-economic power can

further improve the performance of supply chain integration by enhancing the degree of effective process coordination and information sharing. This supports the argument of this study that both process coordination and information sharing are vital for contract farming in supply chain integration. For instance, when a company uses non-economic power on farmers, it is usually to change the behaviours or attitudes of the farmers by providing knowledge and support. In other words, its mechanism is that the farmers will receive benefits if they are obedient (Lusch and Brown, 1982; Zhao et al., 2008). Thus, affected farmers will feel that their autonomy, in decision-making and behaviour, is respected (Scheer and Stern, 1992; Maloni and Benton, 2000). They will make positive changes to benefit the company, then promote the quality of their relationship (Park et al., 2017). This pushes farmers to be more willing to integrate with the company through improved process coordination and information sharing. In particular, in contract farming, companies provide professional technical guidance and support to farmers (e.g. specialised feeds, seedlings, medicines, vaccines and technician visits on a regular basis), while cultivating still stronger non-economic power, which can convince farmers of a company's professional influence and strengthens farmers' information exchange with that company (Yeung et al., 2009). This also encourages farmers to actively participate in the short and long-term planning processes of the company, which promotes farmers' information sharing and process coordination with the company. The situation is the same from the company's perspective. For example, by offering farmers proper training (e.g. Six Sigma) and supporting them to start their own projects, companies gain useful skills and information from the farmers as well. Therefore, this study proposed:

H1: the use of non-economic power is positively related to information sharing in the company–farmer relationship.

H2: the use of non-economic power is positively related to process coordination in the company–farmer relationship.

In contrast, the constant application of economic power has been identified as affecting relational norms negatively (Frazier et al. 1986; Benton and Maloni, 2005) and lowering the strength of relationships between farmers and companies in supply chain integration (Brown et al., 1995; Fu et al., 2014). For example, if a company changes the behaviours or attitudes of its partners (farmers) mainly through incentives, threats or punishments, then the company is using economic power on the farmers. Its mechanism is that farmers

will suffer an inevitable loss if they fail to comply (Kumar and Scheer, 1998). To affected farmers, this would feel as if the company was creating trouble and preventing them from achieving their goals (Frazier and Rody, 1991; Maloni and Benton, 2000). If farmers change their behaviour under these circumstances, it is often out of frustration. Therefore, the application of economic power by a company will destroy the cooperative atmosphere between farmers and that company. In addition, economic power exerts a negative influence on the supply chain relationship between companies and famers (Frazier and Rody, 1991; Fu et al., 2014, Zhao et al., 2018). As a result, these two parties will share a tense atmosphere, which would not be conducive for information sharing and process coordination and may even cause conflict between them (Prajogo and Olhager, 2012).

In addition, because supply chain integration requires that a company invest its efforts (e.g. knowledge, technology and assets) in a relationship, this may lead to opportunism among farmers (Wang et al., 2014). Thus, transaction costs can increase as the company introduces governance practices to prevent against opportunistic behaviour (Cheng and Sheu, 2012). This can further cause deterioration in supply chain process coordination and information sharing. Therefore, the adoption of economic power is in opposition to the normative supply chain integration, which establishes satisfying process coordination and information sharing. Accordingly, this study proposed:

H3: the use of economic power has a negative effect on information sharing in the company–farmer relationship.

H4: the use of economic power has a negative effect on process coordination in the company–farmer relationship.

2.5. The relationship between contract farming and quality performance of agricultural products

The concept of contract farming for supply chain integration is related to information and process flow of raw materials from farmers, which enable companies to maintain an effective production procedure (Jin et al., 2015). Such collaboration creates a close connection between the two parties in a way that makes the boundary of activities less distinct (Williams et al., 2013; Liu et al., 2015). When farmers participate in a company's supply chain integration, the company can help farmers grasp market dynamics and market development trends in a timely manner, which helps farmers understand and meet

the changing needs of consumers; for example, farmers may pay more attention to the quality of agricultural products (Wang et al., 2014). Meanwhile, process coordination would reduce the company's cost of monitoring the production of agricultural products and make the farmers cooperate with the company in an atmosphere of mutual trust, which would positively affect the quality performance of agricultural products (Lehoux et al., 2014; Otsuka et al., 2016).

Studies also demonstrate that solid integration via process coordination and information sharing can mitigate different supply chain issues, such as the bullwhip effect (Prajogo and Olhager, 2012; Niu et al., 2016). For example, contract farming enables companies to apply lean production methods which feature reduced waste, improved efficiency and increased productivity. In this research, quality performance of agricultural products mainly refers to the safety and quality level of agricultural products, which means that farmers may produce safe agricultural products that meet quality standards with the least labour, material and financial resources, while cooperating with the company. The empirical results show that adopting contract farming for supply chain integration enables companies and farmers to behave like a single entity, which can lead to improved quality performance of products produced across the entire chain (Wang et al., 2014; Cachon and Lariviere, 2005; Lehoux et al., 2014; Moazzam et al., 2018). In addition, many operational benefits have been identified, such as reductions in uncertainties, costs and lead time, as well as enhancement in service levels, product distribution and sales and customer satisfaction (Matos and Hall, 2007; Jin et al., 2015; Baluch et al., 2017; Zainol et al., 2019). Thus, this study proposed:

H5: information sharing has a positive effect on the quality performance of agricultural products in the company–farmer relationship.

H6: process coordination has a positive effect on the quality performance of agricultural products in the company–farmer relationship.

Building on the literature review, a theoretical model (Figure 1) can be used to depict the hypotheses and examine the relationships between types of power, supply chain integration and quality performance of agricultural products.

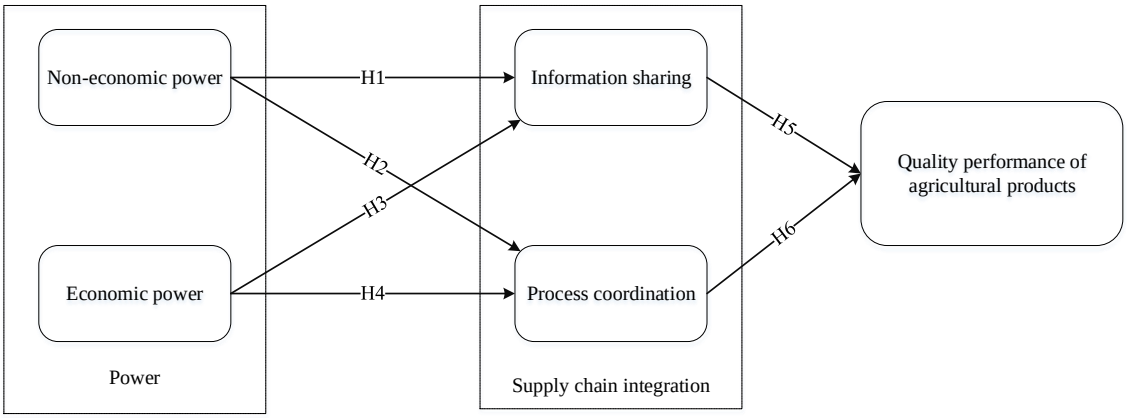


Figure 1: The conceptual model of this study

3. Research methodology

3.1. Questionnaire design

This study analysed contract farming at a system level through two independent surveys of farmers (farm-level data) and agricultural companies (firm-level data) influenced by agricultural industrialisation. The questionnaire consisted of two parts. The first part included the demographic characteristics of the participants, such as age, corporation time and corporation stage for farmers and number of cooperative farmers, ownership, cooperation time and stage for companies. The second part included the subjective variables. A 7-point Likert scale was used. Each variable had more than three items. To ensure the validity of the contents, five constructs were measured, which were all adapted from existing literature. For further information, please refer to Appendices A and B, which contain the questionnaires for companies and farmers, respectively.

Economic power and non-economic power, which were adapted from Brown et al. (1995) and Zhao et al. (2008), were measured separately, according to three items. Contract farming for supply chain integration is subdivided into two dimensions, namely, information sharing and process coordination, which were adapted from Morash and Clinton (1998) and Narasimhan and Kim (2002). Three items were also used to measure information sharing and another three for process coordination. Quality performance of agricultural products was adapted from Huo et al. (2014) and Fu et al. (2017). To ensure that the scale was appropriate for Chinese rural situations, all items were translated from English to Chinese and back-translated from Chinese to English. After the transformations, the questionnaires were pilot tested with a sample of 20 farmers and 15

companies, before the full-scale launch of the survey. Table 1 shows the measurement items and their sources.

Table 1: Measurement items

Constructs	Measures		Sources
	Company's perspective	Farmers' perspective	
Non-economic power	The farmers understand what they are doing (CNP1).	The company understands what it is doing (FNP1).	Brown et al. (1995); Zhao et al. (2008)
	The business knowledge of the farmers is likely to make the farmers do the right thing (CNP2).	Business knowledge may make the company suggest to do things right (FNP2).	
	The farmers have received specialised training and can recognise and take necessary actions (CNP3).	The company has received specialised training and can recognise and take the necessary actions (FNP3).	
Economic power	If the company does not comply with the requirements of farmers, the company will not be treated well by them (CEP1).	If the farmers did not do what as the company asked, the farmers would not have received very good treatment from the company (FEP1).	
	If the farmers find that the company does not follow their requirements, the farmers will retaliate in some way (CEP2).	If the company found that the farmers do not obey it, the company will retaliate in some way (FEP2).	
	The farmers often imply that if the company does not meet their requirements, the farmers will take some actions to reduce the company's profits (CEP3).	The company often hints that if the farmers do not obey it, it will take some actions to reduce the farmers' profits (FEP3).	
Information Sharing	The company shares sales information with the farmers (CIF1).	The farmers share sales information with the company (FIF1).	Morash and Clinton (1998); Narasimhan and Kim (2002)
	The company shares the inventory information of products with the farmers in the process of planting and breeding (CIF2).	The farmers share inventory information with the company (FIF2).	
	The company shares the production planning information with the farmers in the process of planting and breeding (CIF3).	The farmers share the plan information of means of production (chemical fertiliser, pesticides, veterinary	

Constructs	Measures		Sources
	Company's perspective	Farmers' perspective	
		drugs, feed, etc.) with the company in the process of planting and breeding (FIF3).	
Process Coordination	The company monitors the production process together with farmers (CPC1).	The farmers monitor the production process together with the company (FPC1).	
	The company establishes and maintains the performance appraisal system with farmers (CPC2).	The farmers establish and maintain the performance appraisal system with the company (FPC2).	
	The company improves the production process with farmers to better meet each other's needs (CPC3).	The farmers will improve the production process with the company to better meet each other's needs (FPC3).	
Quality performance of Agricultural Products	The cooperation improves the quality of the products (CQP1).	The cooperation improves the quality of the products (FQP1).	Huo et al. (2014); Fu et al. (2017)
	The cooperation reduces the production cost of the products (CQP2).	The cooperation reduces the production cost of the products (FQP2).	
	The cooperation reduces the investment of fixed assets (CQP3).	The cooperation reduces the investment of fixed assets (FQP3).	
	Such alliance reduces the needs of capital investment (CQP4).	The cooperation reduces capital investment (FQP4).	

3.2. Data collection

Both the firm-level data and farm-level data were collected by email and through face-to-face interviews in the Hainan province in China, to study contract farming as a system influenced by agricultural industrialisation. The data collected identifies some of the essential features of the participants in contract farming, perceived satisfaction regarding the collaboration and various types of contractual relationships being established. In total, 500 questionnaires were distributed to farmers and 321 valid questionnaires were received with an effective response rate of 64.2%. Of 280 questionnaires distributed to companies, 78 valid questionnaires were received, with an effective response rate of 27.9%.

Table 2 shows the fundamental characteristics of the companies. There are 78 agricultural companies. Of these, 76.9% cooperate with 500 farmers or less, 70.5% of the companies have cooperation times of less than 10 years and 64.1% are private companies. In terms of the collaboration relationship, 26.9% of the companies believe that the cooperation performance with farmers was not stable, 37.2% believe that trust has developed between the two, 33.3% believe that a long-term relationship has been established between the two parties and 2.6% have begun to feel dissatisfied with the cooperation.

Table 2: Basic Characteristics of Companies

Variable	**Variable value**	**n=78**	
		Frequency	**Percentage**
Number of cooperative farmers	(0, 50]	8	10.26
	(50, 100]	22	28.21
	(100, 500]	30	38.46
	(500, 1000]	4	5.13
	above 1000	12	15.38
	missing data	2	2.56
Cooperation time (years)	(0, 1]	4	5.13
	(1, 3]	10	12.82
	(3, 5]	13	16.67
	(5, 10]	28	35.90
	Above ten years	18	23.08
	Missing data	5	6.41
Ownership	State owned	0	0
	Collective	2	2.56
	Joint venture	8	10.26
	Private	50	64.10
	Others	14	17.95
	Missing data	4	5.13
Cooperation stage	Unstable cooperation performance	21	26.92
	Trust has reached a certain level	29	37.18
	Have established a long-term relationship	26	33.33
	Becoming dissatisfied with the cooperation	2	2.56
	Have ended the cooperation or is in the process of ending it	0	0
	Missing data	0	0

Table 3 shows the fundamental characteristics of farmers. The total number of farmer samples is 321. The age of the farmers is mainly between 30 and 50 years old, accounting for 52.3% and the number of farmers under 30 is 11.53%. The sample shows that cooperation between farmers and companies is still in its infancy. Cooperation times of less than three years account for 41.1%, indicating that most of the farmers surveyed are still at a relatively preliminary stage, and they are still in the process of developing mutual understanding. Of the farmers, 44.2% indicated that they had reached a certain level of trust in their collaboration with companies.

Table 3: Basic Characteristics of Farmers

Variable	Value	n=321	
		Frequency	**Percentage**
Age	(0, 30)	37	11.53
	(30, 40]	80	24.92
	(40, 50]	88	27.41
	above 50	72	22.43
	missing data	44	13.71
Cooperation time (years)	(0, 1]	68	21.18
	(1, 3]	64	19.94
	(3, 5]	55	17.13
	Above five years	35	10.90
	Missing data	99	30.84
Cooperation stage	Unstable cooperation performance	33	10.28
	Trust has reached a certain level	142	44.24
	Have established a long-term relationship	55	17.13
	Becoming dissatisfied with the cooperation	4	1.25
	Have ended the cooperation or is in the process of ending it	11	3.43
	Missing data	76	23.68

4. Analysis and results

4.1. Reliability and validity analysis

This study conducted confirmatory factor analysis to test reliability and validity with SPSS 24.0 and Smart PLS 2.0. It used Cronbach's alpha and composite reliability (CR) to test reliability. Table 4 and Table 5 show the results. The findings of the confirmatory factor analysis display that the items loaded significantly on their respective constructs. The overall model fit and item loadings indicate acceptable unidimensional for the measures (Bentler and Weeks, 1980; Cohen et al., 1990). In terms of reliability, the Cronbach's alpha values of constructs are all above 0.6 (except for that of economic power of company, which is slightly less than 0.60 (0.598)). In addition, the CR values range from 0.791 to 0.900, which indicates overall acceptable reliability of the model (Flynn et al., 1990; Wasko and Faraj, 2005). In terms of validity, it is measured by convergent validity and discriminant validity (Flynn et al., 1990; Raubenheimer, 2004). An average variance extracted (AVE) value higher than 0.5 indicates that the construct has favourable convergence validity. If the square root of the AVE of each construct is

higher than the correlation coefficient of other constructs, the scale has discriminant validity. From the results shown in Tables 4 and 5, the AVE values of constructs are all greater than 0.5. In addition, the AVE square root of each construct (bold numbers in a diagonal line in Table 6 and Table 7) are higher than the corresponding correlation coefficients (values in the non-diagonal line in Tables 6 and 7). Overall, given the above information, the data represents good reliability, convergent and discriminant validity.

Table 4: Reliability and convergent validity analysis of companies

Constructs	**Items**	**Loadings**	**Cronbach's alpha**	**CR**	**AVE**
Non-economic power	CNP1	0.870	0.720	0.844	0.644
	CNP2	0.804			
	CNP3	0.728			
Economic power	CEP1	0.583	0.598	0.791	0.564
	CEP2	0.765			
	CEP3	0.875			
Information sharing	CIS1	0.842	0.833	0.900	0.750
	CIS2	0.845			
	CIS3	0.910			
Process coordination	CPC1	0.819	0.764	0.864	0.679
	CPC2	0.819			
	CPC3	0.834			
Quality performance of agricultural products	CQP1	0.818	0.802	0.871	0.630
	CQP2	0.675			
	CQP3	0.869			
	CQP4	0.801			

Table 5: Reliability and convergent validity analysis of farmers

Constructs	**Items**	**Loadings**	**Cronbach's alpha**	**CR**	**AVE**
Non-economic power	FNP1	0.713	0.660	0.810	0.589
	FNP2	0.828			
	FNP3	0.757			
Economic power	FEP1	0.716	0.780	0.873	0.698
	FEP2	0.882			
	FEP3	0.897			
Information sharing	FIS1	0.816	0.715	0.840	0.637
	FIS2	0.818			
	FIS3	0.759			
Process coordination	FPC1	0.860	0.786	0.875	0.701
	FPC2	0.835			
	FPC3	0.815			
Quality performance of agricultural products	FQP1	0.658	0.760	0.845	0.579
	FQP2	0.829			
	FQP3	0.797			
	FQP4	0.749			

Table 6: Discriminant validity analysis of companies

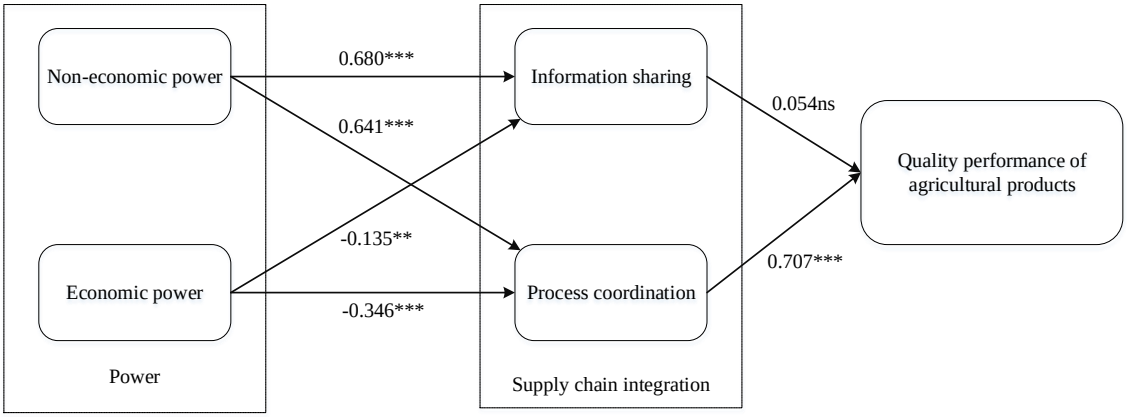
	1	**2**	**3**	**4**	**5**
1. Non-economic power	**0.803**				
2. Economic power	-0.409	**0.751**			
3. Information sharing	0.735	-0.413	**0.866**		
4. Process coordination	0.782	-0.608	0.737	**0.824**	
5. Quality performance of agricultural products	0.747	-0.475	0.575	0.747	**0.794**

Table 7: Discriminant validity analysis of farmers

	1	2	3	4	5
1. Non-economic power	**0.767**				
2. Economic power	0.105	**0.836**			
3. Information sharing	0.235	-0.100	**0.798**		
4. Process coordination	0.284	0.020	0.542	**0.837**	
5. Quality performance of agricultural products	0.391	0.149	0.358	0.379	**0.761**

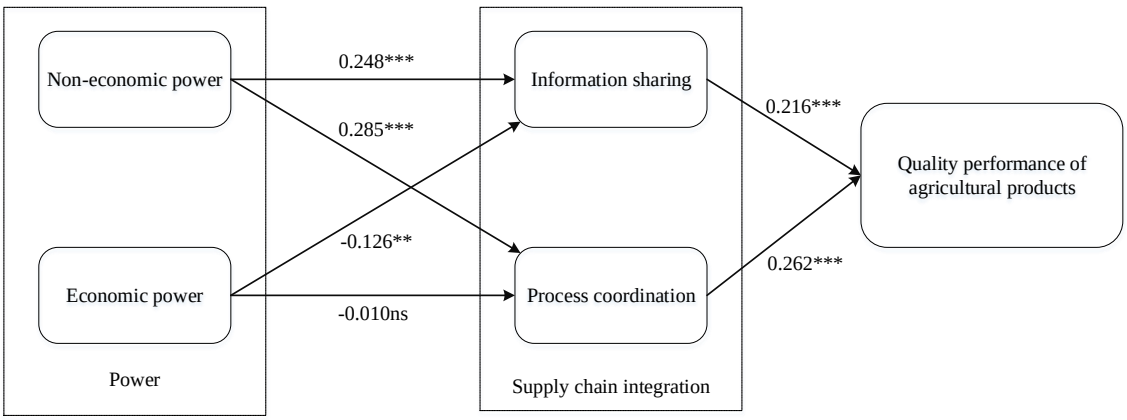
4.2. Structural equation modelling and results

This study applied Smart PLS 2.0 to test the proposed theoretical model empirically. Figure 2 and Figure 3 show the path coefficients.



Note: * p< 0.05, ** p< 0.01, *** p< 0.001

Figure 2: Structural equation model of companies



Note: * p< 0.05, ** p< 0.01, *** p< 0.001

Figure 3: Structural equation model of farmers

The results show that a significant, positive relationship exists between non-economic power and information sharing (companies' perspective: $\beta = 0.680$, $p < 0.001$; farmers' perspective: $\beta = 0.248$, $p < 0.001$), which indicates a positive effect of non-economic power on information sharing from both companies' and farmers' perspectives. Thus, H1 was supported. Also, the results show that the positive relationship between non-economic power and process coordination is also significant (companies' perspective: $\beta = 0.641$, $p < 0.001$; farmers' perspective: $\beta = 0.285$, $p < 0.001$) for both companies and farmers. Hence, H2 was confirmed.

The results also show the relationship between economic power and contract farming for supply chain integration. From the companies' perspective, the negative relationship between economic power and information sharing ($\beta = -0.135$, $p < 0.01$) is significant, indicating that H3 was supported. A significant, negative relationship exists between economic power and process coordination ($\beta = -0.346$, $p < 0.001$), which supports H4. From the farmers' perspective, a significant, negative relationship exists between economic power and information sharing ($\beta = -0.126$, $p < 0.01$), indicating support for H3. A negative relationship exists between economic power and process coordination ($\beta = -0.010$, $p > 0.05$), which contradicts H4.

In terms of the relationship between contract farming for supply chain integration and quality performance of agricultural products, the results indicate that from the farmers' perspective, a positive relationship exists between information sharing and quality performance of agricultural products ($\beta = 0.216$, $p < 0.001$). This supports H5. However, from the companies' perspective, the positive relationship between information sharing and quality performance of agricultural products ($\beta = 0.054$, $p > 0.05$) is not significant, contradicting H5. Last, a positive relationship exists between process coordination and quality performance of agricultural products from both the companies' and farmers' perspectives (companies' perspective: $\beta = 0.707$, $p < 0.001$; farmers' perspective: $\beta = 0.262$, $p < 0.001$). Thus, H6 is supported. Table 8 summarises the results of the hypothesis test.

Table 8: Results of the hypothesis test

Hypotheses	**Companies' perspective**		**Farmer's perspective**	
	t-value	output	t-value	output
H1: non-economic power → information sharing (+)	22.349	**Supported**	5.884	**Supported**
H2: non-economic power → process coordination (+)	25.169	**Supported**	5.983	**Supported**
H3: economic power → information sharing (-)	3.031	**Supported**	2.904	**Supported**
H4: economic power → process coordination (-)	9.062	**Supported**	0.171	**Rejected**
H5: information sharing → quality performance of agricultural products (+)	0.990	**Rejected**	4.199	**Supported**
H5: process coordination → quality performance of agricultural products (+)	16.438	**Supported**	5.309	**Supported**

5. Discussion and managerial implications

5.1. The effect of power on contract farming for supply chain integration

The results show that non-economic power has a significant, positive effect on contract farming for supply chain integration. This means that the use of non-economic power can enhance information sharing and process coordination between farmers and companies. This is different from the empirical results of Zhao et al. (2008). Particularly, Zhao et al. (2008) examined the effect of power and relationship commitment on supply chain integration. They focused on manufacturing companies and mainly investigated the relationship between manufacturers and customers in supply chains. Their results imply that expert power and referent power in non-economic powers can positively affect customer integration by positively affecting normative relationship commitments. However, legal power in non-economic power does not significantly affect customer integration. This inconsistency can be explained. First, the industry being researched is different. Zhao et al. (2008) chose the manufacturing industry as their research object, but the object of this study is agriculture. Moreover, the objects of the study differ in terms of power. In the context of the buyers' market, Zhao et al. (2008) chose customers as objects, which was a relatively strong side. However, the objects of this study are farmers and companies. The farmers are on a weaker side, compared with the companies. Further, Zhao et al. (2008) identified the relationship between manufacturer and customers and cooperation between companies. In the contract farming context, the relationship between

farmers and companies exists between several farmers and one company, which is a many-to-one relationship. Therefore, in the process of cooperation, the use of non-economic power will promote supply chain integration between companies and farmers.

In addition, these research findings show that economic power has different effects on contract farming for supply chain integration from a binary perspective. From the farmers' perspective, a company's use of economic power has a significant, negative effect on information sharing and has no significant effect on the process coordination between the farmer-company relationships in a supply chain. From the companies' perspective, the empirical results indicate that farmers using economic power have a significant negative effect on process coordination and information sharing in the farmer-company relationship. The finding of the relationship between economic power and farmers–companies relationships for supply chain integration contradicts the findings of Brown et al. (1995), who suggest that power is somewhat balanced between suppliers and retailers. This might be because of cultural differences (Yeung et al., 2009; Maloni and Benton, 2000). Moreover, the finding further extends the studies of Prajogo and Olhager (2012) and Zhao et al. (2008). For example, Zhao et al. (2008) indicate that economic power has an indirect, positive influence on customer integration through instrumental relationship commitments. There are two main reasons for these differences. Process coordination is generally led by the company and farmers occupy the integrated position (Liu et al., 2015). Even if the farmers do not like the company using economic power, they submit to humiliation. Farmers have to continue to engage in process coordination with companies because they have no choice of whether to participate in the process of coordination. In addition, because farmers are in a weak position, when they use economic power the company with a strong position does not care (Frazier et al. 1986; Benton and Maloni, 2005). Instead of being influenced by the farmers, the company will be reluctant to share information with farmers. Therefore, for long-term cooperation, companies and farmers should avoid the use of economic power that could make one party not share information with the other party, as it would be adverse to the improvement of quality performance.

5.2. Improving quality performance of agricultural products through contract farming

From farmers' perspectives, empirical results show that the use of contract farming for supply chain integration has a significant, positive effect on quality performance of agricultural products for both farmers and companies. It indicates that supply chain management requires both process coordination and information sharing and should not restrict itself to only one of these aspects. This is consistent with the conclusions of Huo et al. (2014), Prajogo and Olhager (2012) and Fu et al. (2017), but inconsistent with Swink et al. (2007), who found that integration with suppliers has a negative effect on quality performance. Form companies' perspectives, the results indicate that only process coordination promotes quality performance, but information sharing does not. This is consistent with prior studies such as Van der Vaart and van Donk, (2008), Frohlich and Westbrook (2001) and Li et al. (2009), who performed research in various contexts and identified a positive relationship between process coordination and performance outcomes of supply chains. Moreover, according to Moye and Langfred (2004), information sharing might exacerbate project conflict and relationship conflict within the company, through opposition in suggestions and opinions, and have a negative effect on the quality performance of the products. Further, from farmers' perspectives, process coordination has a more significant effect on the quality performance of agricultural products than information sharing. This indicates that the effect of information sharing is time-sensitive, the cycle of the influence of process coordination is relatively long and the degree of impact is relatively deep (Liu et al., 2005; Prajogo and Olhager. 2012). Therefore, for long-term cooperation with farmers, if the aim is to enhance quality performance of agricultural products, companies should first highlight the importance of process coordination, then, while perfecting process coordination, turn their attention to information sharing.

6. Conclusions and future research

This study empirically investigated the relationships between different types of power, supply chain integration and quality performance of agricultural products in contract farming. To the best of the researchers' knowledge, this is the first study to examine these relationships using data collected from both companies and farmers in Chinese agricultural supply chains. China's unique national culture and fast increasing

agribusiness base allow this study to extend the existing literature and offers important, practical implications for both supply chain practitioners and scholars.

Further, this research selected China as a particular case for the following reasons. First, unlike other developing economies, such as Africa and Latin America, which have been open to foreign markets since the 1970s, China does not have a long tradition of contract farming (Guo et al., 2007). This offers a great chance to study how the adoption of contract farming affects development. Second, China has a substantial agricultural market and recently founded companies to serve the market. In addition, the number of small and low-income farmers in China is tremendous (Zhang and Aramyan, 2009). Third, China has a powerful government defined by collectivism and high power distance. As such, it is a unique context for exploring issues associated with different types of power and contract farming for supply chain integration (Zhao et al., 2008). Given these reasons, although there may be heterogeneity across different contexts regarding the adoption of contract farming, the results generated from this research are generalisable to other developing countries and can contribute to the existing literature, which mostly focuses on developed economies (Igata et al., 2008; Warning and Hoo, 2000; Glover and Kusterer, 2016). These results can generate fruitful implications for contract farming in developing economies.

6.1. Theoretical contributions

The theoretical contributions of this research are reflected in the following three aspects. First, this study analyses how two types of power affect contract farming for supply chain integration and enrich the relevant literature surrounding power in one-to-many relationships. Power remains an important yet overlooked element in contract farming. Thus, the unique attributes of power within supply chain integration continue to be ambiguous (Podsakoff and Schriescheim, 1985; Yeung et al., 2009). Many companies do not fully acknowledge the different types of power and subsequently cannot effectively engage their own power bases (Mast, 2010). Accordingly, this study complements the literature and identifies that proper use of different types of power (i.e. non-economic and economic power) can significantly enhance contract farming for supply chain integration and offer insights into power-relationship commitment theory in China.

Second, the intensive competition in agribusiness means that the supply chain has rapidly become vertically integrated with developing economies, with contract farming as the key integration approach for most agri-products grown for regional and global food consumption (Ariffin et al., 2015; Zainol et al., 2019). Studies show that risk reduction and transaction cost reduction are the two main reasons for contract farming (Krishnan et al., 2004; Lehoux et al., 2014). However, this study identified another important reason for contract farming—improved product quality. In particular, it investigated how the two dimensions of contract farming for supply chain integration affect the quality performance of agricultural products and it enriches the literature by identifying the effect of different types of supply chain integration on the quality performance of agricultural products, in the contract farming context.

Finally, this study adopts two independent studies to gain a comprehensive understanding of the perspectives of both companies and farmers. As the two parties have different objectives and operations, relying on a single perspective can lead to inconsistencies in the research findings (Guo et al., 2007; Niu et al., 2016). Therefore, this study extends the existing literature surrounding contract farming from both farmers' perspectives (Dada et al., 2007; Fu et al., 2013b; Saenger et al., 2013) and companies' perspectives (Krishnan et al. 2004; Sartorious and Kirsten, 2007; Chiu et al., 2011), and examines contract farming, as a system, from both perspectives.

6.2. Managerial Implications

Today, the growing requirement for improved quality of agricultural products in developing countries is significantly changing traditional agricultural markets (Otsuka et al., 2016). The transformations in agricultural business (the so-called 'agricultural industrialisation') brought about a requirement for higher degrees of controlled collaboration (Matos and Hall, 2007). Accordingly, one widely embraced approach is contract farming, which generates guarantees – necessary for sustaining the continuous operations of vulnerable farmers – while enabling manufacturers to manage the aggregate supply chain risks and prices. In this way, agricultural product processing manufacturers—hereafter referred to as 'companies'—collaborate with famers from relatively small and financially challenged farms (Wang et al., 2014). According to Baluch et al. (2017), companies and distributors, who are searching for efficient and novel

approaches to obtaining good-quality raw material, are broadly applying contract farming as a new way to manage supply chain relations. Thus, contract farming can enable a wide range of incentive practices, such as quality evaluation, the use of input monitors, incentive pay and field visits, all of which aim to improve the quality of agricultural products (Krishnan et al., 2004; Datta, 2017).

The results of this study have the following managerial implications for agricultural companies and farmers. Above all, companies and farmers should be aware of the importance of contract farming for quality performance of agricultural products. Quality performance can be further enhanced by improving process coordination and information sharing efforts. In particular, the results suggest that companies should actively guide farmers to participate in process coordination and multilaterally expand information communication channels with them. This objective can be realised through initiatives such as training sessions, forums and event conferences, deployment of technicians to visit farmers on a regular basis and the establishment of a championship system to encourage information exchange among farmers (Moye and Langford, 2004; Prajogo and Olhager, 2012). It would also be beneficial for farmers to join the channels provided by the company, as it is an effective way to improve product quality performance to meet the standards set by the company.

Moreover, companies and farmers should be aware that different applications of power have various effects on contract farming for supply chain integration. The use of non-economic power should be strengthened to promote supply chain integration between farmers and companies. This can be achieved by allowing farmers to recognise a company's expertise, special skills or knowledge and encouraging them to cooperate with that company through multiple, technical training courses (Brown et al., 1995; Maloni and Benton, 2000). Regular or occasional events and conferences that emphasise the common and long-term goals of cooperation with farmers, while cultivating the common values of both parties, would increase a sense of identity that includes one another. In contrast, companies and farmers should minimise the use of economic power because it is not conducive to information sharing, the improved quality performance of agricultural products or sustainable agricultural development. This is especially important for farmers, as the use of economic power will reduce the willingness of both parties to coordinate the process, which is not conducive to sustainable agricultural development.

6.3. Limitations and Future Research

However, there are also several limitations and opportunities for future research. First, multicultural studies should be added in the future to accommodate the different cultures in other countries. According to Yeung et al. (2009), in a high power distance national culture, such as China, there is a recognition of power inequalities. For example, individuals may anticipate that decisions will be made by powerful parties and might feel uncomfortable otherwise (Benton and Maloni, 2005). Non-economic power relies on the perception of the type of power itself, rather than its performance, so this study anticipates that it will be powerful in China, where perceived diversities in power are considered significant (Zhao et al., 2008). In addition, high power distance national cultures are more likely to be receptive to the adoption of economic power because it requires less legitimisation in such a culture (Yeung et al., 2009). Given the fact that this study collected its data from the region of Hainan, China. Data from different regions should also be collected to further explore and verify the relationships. Second, the role of power in supply chain integration should be subdivided into different types of non-economic and economic powers that can affect contract farming for supply chain integration more explicitly. This study used cross-sectional data and unilateral data to test the proposed model. Longitudinal data could be used in future research to provide an in-depth view of the relationships between power, supply chain integration and quality performance in contract farming.

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Appendix A

Contract Farming Between companies and farmers Questionnaire: To companies

Introduction:

This survey aims to study the collaboration stability of contract farming between companies and farmers. Please answer all of the questions to the best of your knowledge. In the questionnaire, company refers to the company that forms alliance with farmers within the People's Republic of China. Please circle the numbers that best describe your level of agreement or disagreement with each of the statements below. The information gathered will be kept confidential and only used for research purpose. If you have any question about this survey or have something to inquire, please get in touch with: College of Economic and Management, South China Agricultural University, Fu Shaoling; E-mail: lfbfu@scau.edu.cn

Section 1: Basic Information

For the purpose of statistical study, please answer the following questions regarding your basic information.

1. The full name of the interviewed company:
2. Company address:
3. How many farmers does your company cooperate with?
   (1). (0,50]
   (2). (50,100]
   (3). (100,500]
   (4). (500,1000]
   (5). above 1000
4. How long have your company been cooperating with the farmers?
   (1). (0,1]
   (2). (1,3]
   (3). (3,5]
   (4). (5,10]
   (5). Above ten years
5. The business nature of your company：
   (1). state-owned business
   (2). collectively-owned enterprise
   (3). Sino-foreign joint venture
   (4). private enterprise
   (5). other, please state_____
6. How do you describe the current stage of your alliance (select one of the answers from below)?
   (1). Both cooperation parties are exploring and testing the consistency of their goals, sincerity, and the alliance performance is not stable.
   (2). Both cooperation parties are benefitting from the increasing profits as a result of the relationship. Both parties trust each other to a certain degree and are satisfied with the outcome, and thus would like to make further effort to establish long term relationship
   (3). Both parties have established continuous and long-term relationship and have been obtaining satisfactory results.
   (4). One or both parties becomes discontented with the cooperation and plans to end the relationship, seek for other partners, and start to express that the cooperation relationship is over.
   (5). Both parties start negotiations to end the cooperation, or have been taking actions to actually terminate the relationship.

Section 2: Construct Measurement

Please answer the following questions regarding powers (1=strongly disagree; 7=strongly agree).

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
The farmers understand what they are doing	1	2	3	4	5	6	7
The business knowledge of the farmers is likely to make the farmers do the right thing	1	2	3	4	5	6	7
The farmers have received specialised training and can recognise and take necessary actions	1	2	3	4	5	6	7

If the company does not comply with the requirements of farmers, the company will not be treated well by them							
If the farmers find that the company does not follow their requirements, the farmers will retaliate in some way	1	2	3	4	5	6	7
The farmers often imply that if the company does not meet their requirements, the farmers will take some actions to reduce the company's profits	1	2	3	4	5	6	7

Please answer the following questions regarding contract farming for supply chain integration.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
The company monitors the production process together with farmers	1	2	3	4	5	6	7
The company establishes and maintains the performance appraisal system with farmers	1	2	3	4	5	6	7
The company improves the production process with farmers to better meet each other's needs	1	2	3	4	5	6	7
The company shares sales information with the farmers	1	2	3	4	5	6	7
The company shares the inventory information of products with the farmers in the process of planting and breeding	1	2	3	4	5	6	7
The company shares the production planning information with the farmers in the process of planting and breeding	1	2	3	4	5	6	7

Please answer the following questions regarding quality performance.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
The cooperation improves the quality of the products	1	2	3	4	5	6	7
The cooperation reduces the production cost of the products	1	2	3	4	5	6	7
The cooperation reduces the investment of fixed assets	1	2	3	4	5	6	7
Such alliance reduces the needs of capital investment	1	2	3	4	5	6	7

This is the end of the questionnaire. Thank you for your time and support.

Appendix B

Contract Farming Between companies and farmers Questionnaire: To farmers

Introduction:

This survey aims to study the collaboration stability of contract farming between companies and farmers. Please answer all of the questions to the best of your knowledge. In the questionnaire, company refers to the company that forms alliance with farmers within the People's Republic of China. Please circle the numbers that best describe your level of agreement or disagreement with each of the statements below. The information gathered will be kept confidential and only used for research purpose. If you have any question about this survey or have something to inquire, please get in touch with: College of Economic and Management, South China Agricultural University, Fu Shaoling; E-mail: lfbfu@scau.edu.cn

Section 1: Basic Information

For the purpose of statistical study, please answer the following questions regarding your basic information.

1. Your full address:
2. The age of the householder (person who serves as the lead of the family):
   (1). (0,30)
   (2). [30,40)
   (3). [40,50)
   (4). above 50
3. How long have you been cooperating with the company (Years)?
   (1). (0,1]
   (2). (1,3]
   (3). (3,5]
   (4). Above five years
4. How do you describe the current stage of your alliance (select one of the answers from below)?
   (1). Both cooperation parties are exploring and testing the consistency of their goals, sincerity, and the alliance performance is not stable
   (2). Both cooperation parties are benefitting from the increasing profits as a result of the relationship. Both parties trust each other to a certain degree and are satisfied with the outcome, and thus would like to make further effort to establish long term relationship
   (3). Both parties have established continuous and long-term relationship and have been obtaining satisfactory results.
   (4). One or both parties become discontented with the cooperation and plans to end the relationship, seek for other partners, and start to express that the cooperation relationship is over.
   (5). Both parties start negotiations to end the cooperation, or have been taking actions to actually terminate the relationship.

Section 2: Construct Measurement

Please answer the following questions regarding powers (1=strongly disagree; 7=strongly agree).

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
The company understands what it is doing	1	2	3	4	5	6	7
Business knowledge may make the company suggest to do things right	1	2	3	4	5	6	7
The company has received specialised training and can recognise and take necessary actions	1	2	3	4	5	6	7
If the farmers did not do what as the company asked, the farmers would not have received very good treatment from the company							
If the company found that the farmers do not obey it, the company will retaliate in some way	1	2	3	4	5	6	7

The company often hints that if the farmers do not obey it, it will take some actions to reduce the farmers' profits	1	2	3	4	5	6	7

Please answer the following questions regarding contract farming for supply chain integration.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
The farmers monitor the production process together with the company	1	2	3	4	5	6	7
The farmers establish and maintain the performance appraisal system with the company	1	2	3	4	5	6	7
The farmers will improve the production process with the company to better meet each other's needs	1	2	3	4	5	6	7
The farmers share sales information with the company	1	2	3	4	5	6	7
The farmers share inventory information with the company	1	2	3	4	5	6	7
The farmers share the plan information of means of production (chemical fertiliser, pesticides, veterinary drugs, feed, etc.) with the company in the process of planting and breeding	1	2	3	4	5	6	7

Please answer the following questions regarding quality performance.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
The cooperation improves the quality of the products.	1	2	3	4	5	6	7
The cooperation reduces the production cost of the products.	1	2	3	4	5	6	7
The cooperation reduces the investment of fixed assets	1	2	3	4	5	6	7
The cooperation reduces capital investment	1	2	3	4	5	6	7

This is the end of the questionnaire. Thank you for your time and support.

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