The role of guanxi networks and contracts in Chinese vegetable supply chains

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Abstract
This paper investigates the effect of personal relationships (called guanxi in China) and contractual governance on compliance with channel requirements and on market performance for both vegetable farmers and processing and exporting firms in China. A survey of 167 farmers and 84 firms in Jiangsu Province, P.R. China provides the data for empirical study based on a structural model. The results demonstrate that guanxi networks in China significantly improve small-scale farmers' compliance with buyers' delivery requirements based on formal contracts, which eventually improve farmers' market performance. Vegetable firms, on the other hand, place more emphasis on formal contracts in order to improve suppliers' compliance with delivery requirements and thereby improve their own profitability. The results reveal that personal relationships and contracts have different impacts on farmers and firms.

Keywords: small-scale farmers, governance, channel requirements, performance

1. Introduction

China supplies more than one-third of world's vegetables, which makes it the biggest vegetable producer in the world today (FAO, 2004). China's vegetable sector, however, faces several challenges in the rapidly developing national and international markets with their high quality and safety requirements (Liu et al., 2004). While the rapid increase in production scale has led to an over-supply of low-quality vegetables, vegetable quality and safety have become major constraints for the further development of the Chinese vegetable sector. Chinese vegetable producers (mainly small-scale farmers) have difficulties implementing advanced planting and management technology due to technical, managerial and financial constraints (Hu and Xia, 2007); therefore, they are not able to comply with buyers' quality requirements.

Vegetable production in China is characterised by its small-scale, low productivity and inconsistent supply. It is not well organised (Lu, 2007) and contract farming is not well developed. Most of the farmers deliver their products to traditional channels based on their own experience (Ruerd Ruben et al., 2007a). Vegetable transactions are mostly conducted in face-to-face negotiations and with cash payments. Collaboration between farmers and buyers in long-term business relationships is limited. Therefore, farmers are not able to enter high-value market outlets, such as supermarkets and international markets. Vegetable firms (i.e. processing and exporting companies in this study) also face problems in acquiring high-quality vegetables from the supplier market. Constructing effective and efficient vegetable supply chains in order to improve overall performance of the vegetable sector must therefore become a priority task for the Chinese government.

In the Chinese business environment (e.g. in vegetable supply chains), personal relationships, called guanxi [1], provide a basis for communication and information sharing, trusted relationships and collaboration. Guanxi is a special type of relationship that bonds the exchange partners based on reciprocal obligations to obtain resources through continual cooperation and exchange of favours (Davies et al., 1995). Guanxi is transferable from one person to another; both direct and indirect personal connections weave multilayer guanxi networks. Guanxi is the lifeblood of the Chinese business community and extends into society and politics (Wong and Leung, 2001).

Studies on Chinese guanxi started from business writings in the West that advised foreign businessmen about the cultural factors that affect doing business in China (Alston, 1989). Later studies mainly focused on the comparison of the western concept of relationships and the Chinese concept of guanxi (Arias, 1998; Wong and Chan, 1999). Researchers identified several benefits of Chinese guanxi networks. Guanxi-based business transactions show transaction cost advantages (Standifird and Marshall, 2000), enhance competitive advantage (Thorelli, 1986), improve firms' efficiency and growth (Luo and Chen, 1997), and facilitate long-term business success in China (Yeung and Tung, 1996).

Researchers have studied guanxi in China from different perspectives, such as marketing and negotiation (Lee and Lo, 1988) and relationship marketing (Wong and Leung, 2001). However, little research has been directed to the Chinese agrifood sector (Cunningham, 2001), and no systematic attempts have been made to investigate the impacts of personal relationships on market performance (Lu et al., 2008). Contract farming is not well developed in China, so few studies have focused on the mutual effects of personal relationships and contracts in the agrifood sector, nor their joint effects on market performance. This study is an attempt to bridge this gap using the Chinese vegetable market as an illustration. The objective of this paper is to explore how Chinese guanxi networks and contracts (jointly) affect market performance for vegetable farmers and firms. We hope it will provide insights into how to stimulate the further development of the Chinese vegetable sector in general, and enhance market performance for farmers and firms, in particular.

The remainder of this paper is structured as follows. Section 2 develops the research model on the interactions between guanxi networks, contractual governance, and market performance. Section 3 introduces the research design. The empirical results are presented in Section 4. Major conclusions are discussed in Section 5 and the paper ends with a discussion of managerial implications.

2. Conceptual research model

In this paper, we develop a conceptual research model to investigate the interactions between guanxi networks, contractual governance, and market performance. For a deeper understanding, we distinguish two levels of market performance. At the first level, we investigate the effects of guanxi networks and contractual governance on compliance with channel requirements in terms of quality standards and delivery conditions. At the second level, we investigate the effects on financial and non-financial performance (efficiency, satisfaction and profitability, see Figure 1).

[1] The word guanxi in Chinese refers to the social networks of personal relationships. It is composed of two Chinese characters, ***guan*** (gate) and ***xi*** (connection). One must pass the gate to get connected to the network (Wang, 2007).

Guanxi networks

Guanxi is a cultural and social concept in China. The meaning and significance of guanxi in the social and business context are complicated (Wu, 1999). Guanxi is more than the exchange of gifts in order to procure favourable business transactions (Standifird and Marshall, 2000). The transferability of guanxi leads to a means to screen potential partners. The flexible and social nature of guanxi permits the members of a guanxi network to deal with unforeseen contingencies arising after agreements are reached. Thus guanxi possesses the capacity to reduce transaction costs associated with environmental uncertainties (i.e. communicating, negotiating and coordinating transactions) and behavioural uncertainties (i.e. opportunism) (Standifird and Marshall, 2000). A well-developed guanxi network in China can help farmers and firms carry out asset-specific value chain activities, which may substantially improve vegetable quality and farmers' delivery capabilities. This facilitates quality and delivery requirements, which may eventually lead to good market performance (high level of efficiency, satisfaction and profitability) for farmers and firms (Lu, 2007).

Guanxi in social life and business is useful for obtaining valuable information (such as demand and price information, buyer availability, etc.) via direct and/or indirect personal connections within the social networks. Theoretical literature suggests that building strong personal relations with the right person is crucial to attain long-term business success in China (Yeung and Tung, 1996). Empirical research on guanxi has shown significant effects on different outcome variables. Guanxi networks encourage trust-based exchanges (Hill, 1995) and moderate investment behavior (Batjargal and Liu, 2004). Both trust and investment are important factors in buyer-seller relationships, which may significantly contribute to market performance improvement for farmers and firms (Claro et al., 2003; Lu, 2007). Another study on Chinese guanxi also suggested a direct impact of guanxi networks on market performance, such as efficiency and growth (Luo and Chen, 1997).

Contractual governance

According to the logic of transaction cost economics, the manager's task is to craft governance arrangements at minimal cost that ensure the delivery of the desired products. Therefore, the role of contracts in business relationships has clear managerial implications (Lusch and Brown, 1996). Contracts between farmers and their buyers imply specific transaction agreements whose terms include a specified price, quantity, quality and duration (Williamson, 1996). The more complex the contract, the greater the specification of promises, obligations and processes for dispute resolution. Long-term contracts are also explicitly drafted with a provision to promote the longevity of exchange (Poppo and Zenger, 2002). If the seller is not able to deliver the desired products to the buyers in accordance with their contracts, the buyer-seller relationships will be terminated. As information spreads quickly, farmers may not to be trusted by other members in a business network if they failed to fulfil their obligations to one of its members. Farmers may also lose transaction opportunities with other existing partners. Thus with a contractual arrangement, the farmers have more incentives and are more willing to comply with their buyers' requirements in terms of product quality and delivery conditions.

Formal contracts are mechanisms by which to reduce risk and uncertainty in exchange relationships (Lusch and Brown, 1996). Therefore, in the vegetable business, both farmers and firms will energetically discuss the content of the contracts in order to have better solutions for quality, quantity, price and delivery, etc. All these can be determined in advance

or during transactions. The more of these factors that are agreed upon by the farmers and their buyers beforehand, the less risk and uncertainty that will be for ongoing transactions; which, in turn, may contribute to the improvement of market performance.

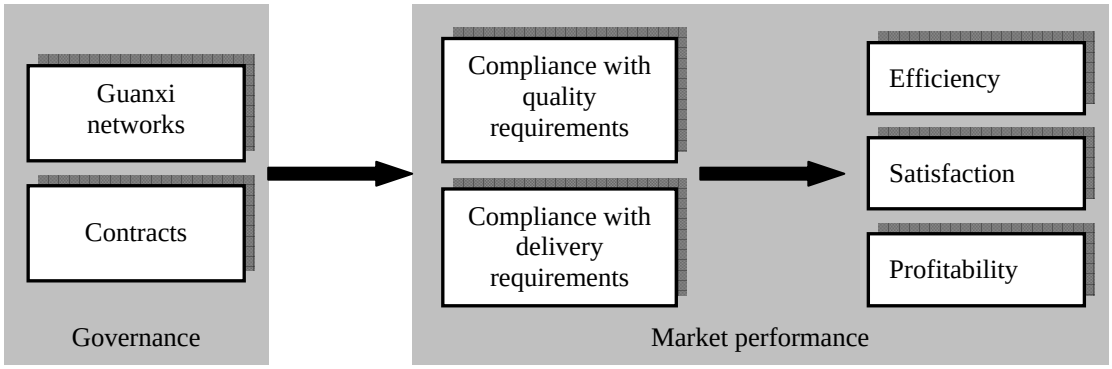

Figure1. Conceptual research model.

Interaction between and joint effects of guanxi networks and contractual governance

Recently, researchers have become interested in the relationships between contractual and relational governance (Ferguson et al., 2005; Poppo and Zenger, 2002; Yu et al., 2006). The main objective of such studies is to determine whether the two forms of governance function as complements or substitutes of each other.

The complementarity view suggests that the joint use of formal and informal arrangements provides more efficient outcomes than the use of either arrangement in isolation. The major and most elaborate argument supporting the complementary view is based on the idea that (even incomplete) formal contracts can facilitate the self-enforcement of informal agreements. It was asserted that formal contracts can reduce the gains from short-term defection, thereby increasing the value of honouring informal dealings (Poppo and Zenger, 2002). The specification of contractual safeguards promotes expectations that the other party will behave cooperatively and thus complements the limits of informal relational governance (Poppo and Zenger, 2002).

The substitution view suggested that formal rules take over the operation of social norms supporting informal dealings. Formal contracts damage the reciprocity norm embodied in informal agreements. The use of punishments as incentives can signal that no reciprocity is expected, thereby placing the relationship in a strictly economic, rather than social, framework (Fehr and Gachter, 2002). Such negative incentives may damage the quality of exchange outcomes by discouraging an individual's voluntary willingness to cooperate, manifested through reciprocity norms (Lazzarini et al., 2004).

Guanxi is widely recognised as the Chinese version of relational governance (Arias, 1998; Wong and Leung, 2001). Chinese society is currently confronted with new laws and regulations as well as its deeply rooted cultural "law" of guanxi. In some situations, guanxi can take precedence over legitimate decisions based on law or regulations (Braendle et al., 2005). Guthrie (1998) studied guanxi as an institutionally defined system (i.e., a system that depends on the institutional structure of society rather than on culture). He concluded that guanxi plays a diminishing role in China and predicted that the legal system (formal governance) will take over the influence of guanxi in the economic transition. Schramm and

Taube (2003), however, observed recently that guanxi networks still prevail and co-exist with the legal system in China. They called for the study of the complementary effects of guanxi networks on formal governance.

Compliance with quality and delivery requirements

Quality requirements and delivery conditions tend to differ widely amongst different outlets in Chinese vegetable markets (Lu, 2007). The farmers can be successful only when they are able to deliver the right products at the right time to the right markets. The buyers, on the other hand, also have to buy the right products from the right market in order to achieve a good market performance. To satisfy the specific requirements regarding quality standards and delivery conditions of specific vegetable buyers, farmers have to upgrade their production system and improve their production practices. As we discussed earlier, both the guanxi networks and contractual governance can help the sellers and buyers to agree upon the delivery and quality specifications that in turn may improve their market performance.

Compliance with buyers' quality requirements and delivery conditions is also a critical consideration for the selection of preferred suppliers (Ruben et al., 2007b). Preferred suppliers are required primary in high-value market outlets (e.g. supermarkets and international markets) with high quality standards. Therefore, complying with channel requirements in terms of quality and delivery conditions is a prerequisite for building and maintaining long-term and close buyer-seller relationships in high-value market outlets for farmers.

Efficiency, satisfaction and profitability

In a buyer-seller relationship, performance measurement and evaluation require special attention. Both financial and non-financial indicators are employed in literature on buyer-seller relationships to measure performance. Previous studies use a variety of financial indicators (both subjective and objective), such as profitability (Mohr and Speckman, 1994) and efficiency (Luo and Chen, 1997) to measure performance. Subjective measures of non-financial performance (such as satisfaction) have also been employed to measure performance (Claro et al., 2003). In this study, we therefore adopt both financial (efficiency and profitability) and non-financial (quality satisfaction) indicators to evaluate the market performance of farmers and firms.

3. Research design

Data collection

In 2005, we collected data from a stratified random sample of 167 farmers and 84 firms from five counties with different socio-economic characteristics in Jiangsu Province, P.R. China. All data were collected based on face-to-face interviews (which have been approved to be the most efficient way to collect data in China (Lu, 2007)). Semi-structured questionnaires were designed. To optimise the validity of the questionnaires, valuable insights were obtained through a series of eight case studies (Lu et al., 2006), literature research and pre-test interviews. The respondents in case studies and pre-test interviews were asked to complete the questionnaire and give comments on the questions. This yielded useful suggestions to improve the content validity of the measurement instrument. Farmers with rich experience in vegetable production and marketing activities as well as high-level managers in the sampled firms (like CEOs) were interviewed in order to minimize response bias (Campbell, 1955). To

enhance translation equivalence, two social science researchers fluent in both languages used forward and backward translation techniques to translate the English questionnaires into Chinese (Mullen, 1995).

Methods

The measures were subjected to a purification process involving a series of reliability and validity assessments using SPSS (Field, 2005) and partial least squares (PLS). In the first step, exploratory factor analysis with varimax rotation was conducted to select the most related items for the following constructs: guanxi networks, contractual governance, compliance with quality and delivery requirements, efficiency, and satisfaction.

In the second step, factor loading, composite reliability, average variance extracted, and item-to-total correlation were obtained from the measurement and structural model to show the validity and reliability of each construct. PLS was chosen to evaluate errors in the construct measurements and hypothesised relations. Although PLS estimation has some shortcomings, such as the bias and inconsistency of loadings and inner structural coefficients (Fornell and Cha, 1994), the choice was motivated by several considerations. First, compared to the better known factor-based covariance fitting approach for latent structural modelling (e.g. LISREL), the component-based PLS avoids two problems: inadmissible solutions (e.g. negative variance) and factor indeterminacy (Fornell and Bookstein, 1982). Second, PLS requires only that the basic assumptions of least squares estimation are satisfied. Third, PLS can model both formative and reflective indicators simultaneously. PLS uses jackknife or bootstrap (Efron and Gong, 1983) in combination with the traditional measures of goodness-of-fit to evaluate the model[2]. Following Chin (1998), bootstrapping with 500 resampling was used to show the precision of the PLS estimates.

Measurements

All the constructs, except profitability, were measured by multiple items in this study. The detailed items used to measure each construct are listed in Appendix 1.

Guanxi networks imply how farmers and firms use their guanxi networks to achieve success in the vegetable business. As a kind of China-specific social capital, we focus on the support that guanxi networks provide for business transactions. Six items were used to measure the impact of guanxi networks for vegetable farmers and two items were used for firms [3], such as the extent to which guanxi networks provide support in finding new buyers, accessing markets and improving production technology.

Contractual governance refers to the transaction arrangements in the vegetable business. Based on transaction cost economics, contractual transactions are made to minimise transaction costs under higher risks and uncertainties (Williamson, 1979). The present paper defines contractual governance based on the agreements made between the farmers and firms

[2] Jackknife and bootstrap are nonparametric approaches to estimate the precision of the PLS estimates (Chin, 1998). The general approach is to delete *n* cases (jackknife approach) or resample with replacement from the original data set (bootstrap approach). Parameter estimates are calculated for each instance, and the variation in the estimates are analyzed. For more details about jackknife and bootstrap, see Efron and Gong (1983).

[3] Originally we had the same items for both samples, but some of the items were filtered out during the exploratory factor analysis.

regarding price, quality, quantity, and delivery conditions. Statements regarding price and quality arrangement between sellers and buyers were used to measure this construct.

Compliance with quality and delivery requirements refers to the farmers' ability to comply with firms' requirements regarding quality standards and delivery conditions. Three and two items were used to measure the constructs for farmer and firm sample respectively. To measure compliance with quality requirements, statements like: "Vegetable quality is important in this market" and "Green A (or AA)[4] quality standards is required for this market" were used. To measure compliance with delivery requirements, statements such as "Consistent delivery is important for this market", "Accurate delivery time and place are important for this market", and "Value added activities are required for this market" were used.

Efficiency refers to the extent to which a transaction used resources appropriately and was completed the transaction in a timely manner. Resources can be time, effort and money. Transaction costs are closely related to the efficiency of the transactions. Both farmers and firms have to spend a lot of time searching for market information and finding good partners. Therefore, in this study, the items related to time and costs of vegetable transactions were used to measure efficiency. Three and two items were used to measure efficiency for farmer and firm sample respectively.

Satisfaction was used to measure the perceived quality and the price received (for farmers) or paid (for firms) for vegetables. Firms are satisfied when the perceived vegetable quality is equal to or higher than what they expected. Firms are also satisfied when the price paid is equal to or lower than what they are expected to pay. Three and two items were used to measure efficiency for farmer and firm sample respectively.

Profitability refers to the ability of the farmers and firms to generate net income from vegetable transactions. It is a commonly used financial indicator for performance measurement (Lusch and Brown, 1996). Due to the difficulties in collecting economic data related to profit from vegetable farmers (no data available) and firms (not willing to provide data for confidential reasons), we measured profitability using a single item of self-reported achievement of expected profitability.

4. Empirical results

Validity and reliability of measures and constructs

Following common practice (Mathieson et al., 2001), we examined the inter-construct correlation, composite reliability and average variance extracted for each construct, for reliability and validity evaluation (see Table 1).

Individual item reliability was determined by examining the loadings of measures on their corresponding constructs. In all cases loadings are greater than 0.6, indicating a high degree of item reliability (see Appendix 1). Internal consistency was assessed using a measure of composite reliability. A value of 0.7 or greater is reasonable for exploratory research

[4] Green A and AA are the two high level food quality standards in China. The basic food quality stands in China is called pollution free food. Green AA is equivalent to organic foods. The detailed information about Chinese food quality system please refer to Liu et al. (2004)

(Nunnally, 1988). In the current study, composite reliability for all constructs exceeded 0.75 (see Table 1, *italic* column), indicating a good internal consistency of the constructs.

The discriminant validity can be assessed in two ways. First, the square root of the average variance extracted (AVE) should be greater than all construct correlations, as is the case here (see Table 1). Second, all items load higher to their associated construct than to the other constructs. The results on both criteria indicated that the discriminant validity of the constructs used in this study is quite adequate.

Table 1. Construct means, standard deviations (SD), composite reliability (CR), construct correlations and average variance extracted (AVE) for both samples.

Farmer sample	**Mean**	**SD**	***CR***	1	2	3	4	5	6	7
1. *Guanxi* networks	3.61	0.62	*0.91*	*0.82*						
2. Contractual governance	3.82	0.72	*0.92*	**0.24**	*0.86*					
3. Compliance with quality requirements	2.45	0.64	*0.84*	**0.43**	**0.22**	*0.79*				
4. Compliance with delivery requirements	4.29	0.50	*0.80*	**0.29**	**0.53**	**0.42**	*0.76*			
5. Efficiency	4.23	0.76	*0.91*	**0.29**	**0.33**	0.11	**0.27**	*0.88*		
6. Quality/price satisfaction	4.33	0.55	*0.81*	**0.42**	**0.38**	**0.37**	**0.48**	0.15	*0.77*	
7. Profitability*	4.44	0.65	*1.00*	0.15	**0.22**	0.11	**0.22**	0.12	**0.48**	*1.00*
Buyer sample	**Mean**	**S.D.**	***CR***	1	2	3	4	5	6	7
1. Guanxi networks	3.84	0.78	*0.79*	*0.81*						
2. Contractual governance	3.87	0.74	*0.92*	**0.24**	*0.79*					
3. Compliance with quality requirements	1.28	0.74	*0.79*	**0.21**	**0.25**	*0.86*				
4. Compliance with delivery requirements	3.95	0.60	*0.81*	**0.23**	**0.48**	**0.38**	*0.88*			
5. Efficiency	4.17	0.76	*0.94*	**0.31**	**0.21**	0.12	**0.27**	*0.94*		
6. Quality/price satisfaction	4.12	0.52	*0.75*	0.11	**0.39**	-0.15	**0.26**	0.15	*0.77*	
7. Profitability*	5.42	1.23	*1.00*	0.03	0.11	0.003	**0.23**	**0.21**	0.04	*1.00*

*: Profitability was measured by 7-point Likert scale.

Note: 1. Square root of AVE are listed at the diagonal of the matrices (*Italic*).

2. In this correlation matrix, correlations (bold) with a value of at least 0.18 are significant at 5% level.

Test of the conceptual model

The results of the path analysis for farmer sample and buyer sample are provided in Table 2. The average variance explained (R^2) for the overall model is 19% and 14% for farmer and firm sample respectively. PLS provides standardised path coefficients, so we can compare the direction and the magnitude of the impacts based on path coefficients.

Effects of guanxi networks and contracts on compliance with channel requirements

The results suggest that guanxi networks and contracts are important drivers for farmers to increase the compliance with channel requirements. Contracts have a greater impact than guanxi networks for vegetable firms, But guan networks have direct and positive effects on farmers' compliance with buyers' quality and delivery requirements (Relationship 1 and 2 in Table 2, left column). This indicates that with the supports obtained from their guanxi networks, farmers are more willing to cope with buyer's requirements and complete transactions based on the agreements. Contractual governance also has significant positive effects on farmers' compliance with buyers' delivery requirements (Relationship 5 in Table 2, left column). This implies that farmers are able to deliver products on time to buyers with a contract. For vegetable firms, guanxi networks do not appear to have significant effects on compliance with channel requirements (Relationship 1 and 2 in Table 2, right column), while contracts do (Relationship 4 and 5 in Table 2, right column). This indicates that vegetable firms' guanxi networks do not significantly help them obtain good vegetables from suppliers. However, within a contractual relationship, their quality and delivery requirements will most likely be fulfilled by their vegetable suppliers.

Table 2. Path model parameter estimates for the farmer (n=167) and firm (n=84) sample.

Relationships	**PLS estimation**	
	Farmer sample	Firm sample
1. *Guanxi* networks → Compliance with quality requirements	0.40 (0.06)**	0.16 (0.12)
2. *Guanxi* networks → Compliance with delivery requirements	0.18 (0.07)**	0.12 (0.09)
3. Guanxi networks → Contractual governance	0.24 (0.07)**	0.24 (0.12)
4. Contractual governance → Compliance with quality requirements	0.12 (0.07)	0.21 (0.10)*
5. Contractual governance → Compliance with delivery requirements	0.49 (0.06)**	0.45 (0.10)**
6. Compliance with quality requirements → Efficiency	-0.08 (0.08)	-0.02 (0.07)
7. Compliance with quality requirements → Satisfaction	0.11 (0.06)	-0.32 (0.12)*
8. Compliance with quality requirements → Profitability	-0.01 (0.05)	-0.10 (0.09)
9. Compliance with delivery requirements → Efficiency	0.11 (0.09)	0.19 (0.13)
10. Compliance with delivery requirements → Satisfaction	0.28 (0.08)**	0.20(0.11)
11. Compliance with delivery requirements → Profitability	0.13 (0.08)	0.27 (0.11)*
12. *Guanxi* networks → Efficiency	0.23 (0.10)*	0.25 (0.12)*
13. *Guanxi* networks → Satisfaction	0.26 (0.07)**	0.04 (0.07)
14. *Guanxi* networks → Profitability	0.08 (0.07)	-0.01 (0.08)
15. Contractual governance → Efficiency	0.23 (0.09)**	0.06 (0.07)
16. Contractual governance → Satisfaction	0.14 (0.07)	0.37 (0.09)**
17. Contractual governance → Profitability	0.13 (0.08)	0.01 (0.08)
Average R^2	**0.19**	**0.14**

Note: **: Path coefficients are significant at 1% level; *: Path coefficients are significant at 5% level.

The results also show a positive significant relationship (in the farmer sample) between guanxi networks and contractual governance (Relationship 3 in table 2). This implies that farmers are more able to engage in contractual transactions when their guanxi networks can support them in the vegetable business. Since the contract is also the assurance for the longevity of business relationships, guanxi networks can in this way help farmers keep stable and long-term marketing relationships. Although the relationship between guanxi networks and contracts is not significant for the firm sample, both positive relations for farmer and firm samples indicate that guanxi networks and contracts are complement each other in the vegetable sector in China.

Effects of compliance with channel requirements on market performance

The results show that compliance with delivery requirements significantly improves farmers' market performance in terms of satisfaction (Relationship 10 in table 2, left column) and firms' market performance in terms of profitability (Relationship 11 in table 2, right column). This indicates that if the farmers are able to comply with their buyers' delivery requirements, the farmers will build a good quality image among their buyers and get a good price. When firms' delivery requirements can be fulfilled by the vegetable suppliers, on the other hand, the firms are more able to reach good profitability. Compliance with quality requirements, however, has a negative effect on satisfaction for the firm sample. The negative effect implies that the higher quality the firms requires, the less satisfaction that firm perceives. This may be because it is difficult for firms to buy qualified Green AA or organic vegetables from the markets and small-scale vegetable farmers are not able to guarantee high-quality production due to technical and economical constraints.

Effects of guanxi networks and contractual governance on performance

Path analyses also show the direct effects of guanxi networks and contractual governance on market performance. The results show that guanxi networks are positively related to efficiency for vegetable farmers and firms (Relationship 12 in Table 2). In a guanxi network, farmers and firms may significantly reduce the time and effort required search for market information and business opportunities, which may significantly increase efficiency. The results also reveal that farmers' guanxi networks are positively associated with satisfaction (Relationship 13 in Table 2, left column). This means that with the support of their guanxi networks, farmers are more able to reach a satisfied buyer-seller relationship regarding perceived quality and price. However, guanxi networks do not directly contribute to profitability (Relationship 14 in Table 2). Building and maintaining a guanxi network is a costly activity; therefore, guanxi networks may not increase profit for farmers and firms.

The results also demonstrate that contracts significantly improve efficiency for farmers (Relationship 15 in Table 2, left column) and increase satisfaction for firms (Relationship 16 in Table 2, right column). This means that in contractual business relationships, it may cost farmers less time and money to deliver vegetables to buyers; and firms will be more satisfied with the quality of the products and pay a good price.

5. Conclusions and discussions

The empirical evidence presented here indicated that the farmers and their buyers may perceive the effects of buyer-seller relationships differently (Claro, 2004). This may also be

the case for the role of guanxi networks in vegetable business, since the farmer and firms hold different position and do not wield the same degree of power. Therefore, in this study, we tried to compare the different paths to market performance.

Different paths to achieve market performance for farmers and firms

By excluding the non-significant paths, we identify the relations focusing on the significant paths. We noticed that there are several similarities for the farmers' and firms' paths to achieving market performance. The most important path to performance involves contractual governance and compliance with delivery conditions. Both the farmer and firm samples indicated that contractual governance is key to complying with channel requirements and crucial to achieving superior performance.

A significant distinction was also found between the farmers' and the firms' paths to achieving market performance. Farmers use the path that can be found in Figure 2 to achieve performance.

The farmers rely on their guanxi networks to come in contact with their buyers and to access (new) markets. In a buyer-dominated market, farmers face severe difficulties in selling their products, such as poor market access, unavailable buyers and low prices. Thus, it is reasonable and important for them to rely on their personal guanxi networks to overcome such problems. In a contractual relationship, farmers are willing to comply with buyers' delivery requirements, thereby improving their quality image and obtaining a good price. These results are consistent with the findings of earlier case studies (Lu et al., 2006). Quality is the powerful "brick" to knock on the "door" of markets. In order to access markets, vegetable farmers may have to rely on their guanxi networks and build up long-term buyer-seller relationships with improved delivery capacity to comply with buyers' requirements.

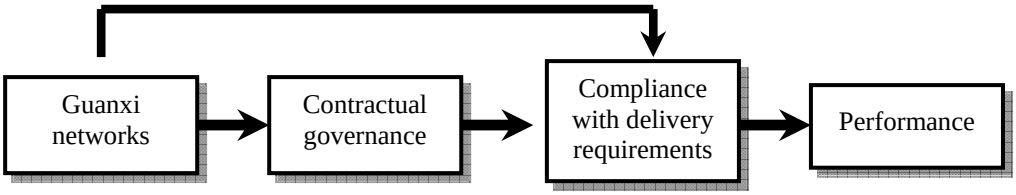

Figure 2. Farmers' path to achieving good performance.

Vegetable firms (such as processing and exporting companies), on the other hand, face few difficulties in buying high-quality vegetables from the suppliers. They therefore tend to rely less on their guanxi networks in purchasing vegetable, and thus follow a different path to achieve performance (see Figure 3).

Under contractual arrangements, the firms can improve their market performance when their delivery requirements are fulfilled by their vegetable suppliers. Interestingly, guanxi networks did not play a significant role in this case. In the Chinese vegetable market, firms face fewer problems in acquiring good quality vegetables. The firms thus have strong negotiation power in markets and do not have to rely on their guanxi networks.

Complementary effect of guanxi networks and formal contracts

The structural model reveals that guanxi networks are positively related to formal contracts in both the farmer and firm samples. The positive relationship indicates a complementary effect of guanxi networks on formal contracts in China. This is consistent with previous studies on guanxi in China (Potter, 2002; Schramm and Taube, 2003). Guanxi, as historical and cultural phenomena, will prevail in Chinese business and co-existent with formal governance in the future. Therefore, combining formal (contracts) and informal (guanxi) governance mechanisms seems to be the best way to organise vegetable supply chains in China.

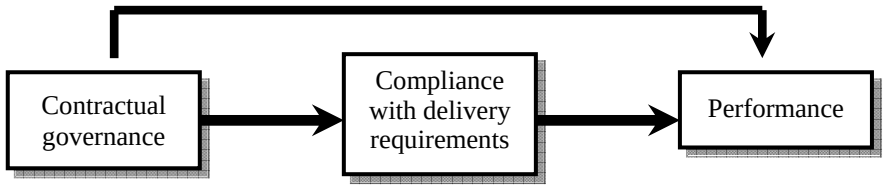

Figure 3. Firms' path to achieving good performance.

6. Managerial implications

The vegetable sector in China is well known for its huge volume of production, the prominent role played by small-scale producers, and increasing international orientation. Achieving business success in long-term buyer-seller relationships is essential for both vegetable sellers and buyers. Based on this study, two managerial implications can be pointed out.

First, guanxi networks play an important role in vegetable business. The results of this study suggest that sellers can increase their ability to comply with buyer's delivery requirements by establishing and maintaining guanxi networks. Guanxi networks increase farmers' access to markets and their opportunities to maintain long-term relationships. So it is important for the farmers to put more efforts into building guanxi networks to expand their markets and to improve their performance.

Second, contract farming should play a predominant role in vegetable business in China. According to the logic of transaction cost economics, contractual governance effectively eliminates costs that ensure the delivery of the desired products. By engaging in contract farming, farmers have guaranteed demand; while buyers are assured of a consistent supply and determined quality. Long-term contracts promote long-term of exchange relationships, which offer a more secure future for small-scale vegetable farmers in China.

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APPENDIX 1. Constructs and items used in the models for the farmer and firm samples.

The farmer sample (N=167)		The firm sample (N=84)	
Constructs	**Loading**	**Constructs**	**Loading**
***Guanxi* networks**		***Guanxi* networks**	
My *guanxi* network supports me to build trust with my input suppliers	0.85	My *guanxi* network supports me to build trust with my suppliers	0.62
My *guanxi* network supports me to access to this market	0.83	My *guanxi* network supports me to order through telephone with my suppliers	0.97
My *guanxi* network supports me to find new buyers in this market	0.77		
My *guanxi* network supports me to build trust with my buyers	0.78		
My *guanxi* network supports me to improve my production technology	0.86		
Contractual governance		**Contractual governance**	
Price is pre-agreed with my buyers	0.87	Price is pre-agreed with my suppliers	0.78
Quality is pre-agreed with my buyers	0.83	Quality is pre-agreed with my suppliers	0.67
Volumes are pre-agreed with my buyers	0.91	Volumes are pre-agreed with my suppliers	0.83
Delivery time and place are pre-agreed with my buyers	0.82	Delivery time and place are pre-agreed with my suppliers	0.87
Compliance with quality requirements		**Compliance with quality requirements**	
Vegetable quality is important for this market	0.80	This supplier delivers vegetables in Green A quality standard	0.89
Green A quality standard is required for this market	0.79	This supplier delivers vegetables in Green AA and organic quality standards	0.84
Green AA and organic quality standards are required for this market	0.80		
Compliance with delivery requirements		**Compliance with delivery requirements**	
Consistent delivery is important for this market	0.76	This supplier delivers consistent quality vegetables	0.80
Accurate delivery time and place are important for this market	0.87	This supplier has accurate delivery time and delivery place	0.95
Value-added activities are required for this market	0.64		
Efficiency		**Efficiency**	
It takes me less time to deliver vegetables to this market	0.80	It costs us less when we purchase vegetables from this market	0.91
It takes me less time to sell vegetables in this market	0.92	It takes us less time to finish an order in this market	0.97
It costs me less when I sell vegetables to this market	0.93		
Satisfaction		**Satisfaction**	
My buyers are satisfied with the quality of my vegetables	0.79	We are satisfied with the quality of the vegetables	0.60
I am happy with the price I get from my buyers	0.87	We are happy with the price we pay to our suppliers	0.91
I get a good price for high quality vegetables from my buyers	0.61		
Profitability		**Profitability**	
To what extent did you achieve the expected profitability with your vegetables selling to this market	1.00	To what extent did you achieve the expected profitability with your vegetables purchasing from this market	1.00

Profitability is measured by 7-point Likert-scales, the others are measured by 5-point Likert-scales (not true at all – totally true).