Akhtar, P., and Khan, Z., (2015), The linkages between leadership approaches and coordination effectiveness: A path analysis of selected New Zealand-UK International agri-food supply chains. *British Food Journal* 117(1), 443–460.

ABSTRACT

Purpose – A suitable leadership approach and multiple dimensions of performance (operational and social dimensions contributing to financial performance – the effectiveness of international agri-food supply chain coordination) are important because of significant linkages between them. However, there has been no such empirical research to explore the linkages in five selected New Zealand-UK international agri-food supply chains (dairy, meat, apples, onions and wine). Therefore, the paper aims to address this knowledge gap.

Design/methodology/approach – Before applying covariance-based structural equation modelling (a path analysis) on the data collected from 112 chain coordinators (chief executive officers, managing directors and head of departments) of the selected agri-food supply chains, a comprehensive process of exploratory factor analysis, reliability and validity tests is used to develop the constructs.

Findings – The findings suggest that chain coordinators' participative leadership approach is highly significantly ($\beta = 0.60; p = 0.00$) associated with the effectiveness of international agri-food supply chain coordination. Directive leadership does not have a significant relationship and its interaction effect with participative leadership resulted in a significant negative relationship with the effectiveness of agri-food supply chain coordination. Moreover, social (satisfaction with and trust in supply chain partners) and operational (service and product quality) dimensions are the major determinants of financial performance (profit, sales and market share) with $\beta = 0.44$ ($p = 0.00$) *and* $\beta = 0.44$ ($p = 0.05$) respectively. These variables jointly explain 70% of the variance in financial performance, and leadership explains 36% of the variance in coordination effectiveness.

Practical implications – In order to understand the multiple dimensions of performance and their linkages, the study enhances the understanding of chain coordinators and contributes to determine the best practices for modern agri-food supply chains.

Originality/value – This study is the first step in developing and confirming complicated linkages with the specific characteristics of selected international agri-food supply chains. As a result, the empirical evidence also clarifies the earlier ambiguous results on the topic raised from other industries or countries.

Keywords Agri-food supply chains, linkages, chain coordinators, leadership, UK, structural equation modelling

Paper type Research paper

1. Introduction

Leadership is a complex social process that helps to lead and direct supply chain partners (Gallos and Heifandetz, 2008). To manage international agri-food supply chains, chain coordinators often practise participative and directive leadership approaches. The former leadership encourages the key supply chain partner to share its decision-making power with other supply chain partners. It further appreciates their recognition, feedback, flexibility and teamwork, which are the vital sources of chain coordinators' tool-kit. The latter leadership approach applies command-and-control rules that replicate directive leadership practices such as uniform procedures, instructions and right and obligation guidelines. The main difference between these two leadership approaches is the sharing of decision-making power among supply chain partners (Mehta et al., 2003; Kruglanski et al., 2007; Akhtar et al., 2011).

The significant linkages between leadership approaches and performance have been recognized by researchers (Ichniowski et al., 1996; Mehta et al., 2003; Oshagbemi and Ocholi, 2006; Akhtar et al., 2011; Akhtar and Fischer, 2014). For instances, sharing of decision-making power among supply chain partners gives the impression of essential mechanisms to improve agri-food supply chain coordination. As a result, involved chain partners increase their productivity. Two examples, outside agri-food chains, are General Motors and Xerox, which have not only increased their productivity but also decreased the cost of absenteeism (Ichniowski et al., 1996). Moreover, Pfeffer (1998) found evidence that a firm reduced 38% defective rates by using participative leadership. Consequently, the firm increased its productivity by 20%. In the same vein, Mehta et al. (2003) conducted a study in the USA, Finnish and Polish automobile industry. They found that there is a highly significant correlation between a participative leadership approach and supply chain partners' motivation (i.e., profit, sales and overall performance). Thus, the coordination among supply chain partners and performance can be more effective when participative leadership is used rather than following directive leadership.

Alternatively, researchers also found support for directive leadership practices, which are effective in certain industries or countries. For instance, to test the impact of leadership practices on performance, Bititci et al. (2004) conducted a study in the US multiple industries (rolling mill, bottled water producer, transport and distribution companies). Their results supported directive leadership rather than participative practices. In support, Kruglanski et al. (2007) stated that directive leadership is suitable when leaders have more experience than followers.

Leadership, particularly participative leadership, assist chain coordinators to achieve the effectiveness of supply chain coordination (Akhtar et al., 2012a). Chain coordinators are chief executive officers, managing directors and head of departments (supply chain managers, marketing managers, chain or channel managers). They are defined as the major decision makers, who control, direct, lead and

manage key supply chain activities (Akhtar et al., 2012a; 2012b). They also participate in joint decision-making with supply chain partners and shareholders. Additionally, chain coordinators are often get involved in hiring, training, solving day-to-day problems, managing and setting a range of salaries for relevant staff members. Besides this, they allocate financial resources, specify jobs and provide essential infrastructures (Akhtar et al., 2012b). Thus, their job is rooted in supply chain dimensions/outcomes such as operational (service and product quality) and social dimensions (satisfaction with and trust in supply chain partners) affecting financial performance (profit, sales and market share). These dimensions collectively represent the effectiveness of supply chain coordination, which is positively linked with the application of suitable leadership and decision support systems (Akhtar et al., 2012a; Bernroider and Schmöllerl, 2013).

The contribution of a particular leadership approach to the individual components of the effectiveness of supply chain coordination has been documented in a number of studies (Mehta et al., 2003; Oshagbemi and Ocholi, 2006; Akhtar et al., 2011). For example, DeConinck (2010) found that participation in decision making builds trust and a perception of fairness. Such participative leadership also stimulates employees' job satisfaction (Wall et al., 1986; DeConinck, 2010). As a result, these social parameters (trust and satisfaction) influence service quality and financial performance (DeConinck, 2010; Akhtar et al., 2012b). Similarly, a longitudinal study of 88 retail stores conducted by Salamon (2008) showed that trust improves service quality and financial performance. Also, Karami et al. (2006) conducted a survey in the UK electronics industry. They found a positive association between chain coordinators' participative leadership practices and strategic development. Smith (2006) and Ness (2009) also demonstrated that participative leadership is better to improve financial and nonfinancial performance.

While the literature from various industries strongly favours participative leadership, it is still not clear which leadership approach is more appropriate in selected New Zealand-UK international agri-food chains (dairy, meat, apples, onions and wine) (Akhtar et al., 2012a). Likewise, Chen and Paulraj (2004), Aramyan et al. (2007) and Sichtmann et al. (2011) also acknowledged the similar knowledge gap in agri-food supply chains. Additonally, the ambiguous results collected from different countries and industries create misunderstanding about leadership and its impact on performance of agri-food chains (Akhtar et al., 2012a). Although studies such as Mehta et al. (2003) and Akhtar et al. (2012a; 2012b) identified chain coordinators (who are the sample members for this study), they did not systematically investigate the impact of chain coordinators' leadership approaches on the effectiveness of supply chain coordination. Further justification for the knowledge gap in the selected chains is discussed in section two, literature review and hypotheses development. Thus, this study significantly contributes by developing and confirming the linkages based on the data collected from two cross-country supply chains. Also, by testing the hypotheses, the study answers two research questions:

Q1: Which leadership approach (participative or directive) shows a significant positive correlation with the effectiveness of international agri-food supply chain coordination?
Q 2: How are the dimensions linked?

The remainder of this research paper is organized as follows. In order to develop the theoretical model and research hypotheses, the interrelationships in the literature review are discussed in section two. The data collection procedure and research methodology are presented in section three. Section four provides the findings produced from structural equation modelling. The final section highlights conclusions.

2. Literature review and hypotheses development

As outlined earlier, the effects of leadership practices on performance dimensions have been scrutinised in certain countries or industries. For example, in New Zealand (NZ), Parry and Proctor-Thomson (2003) investigated the relationships between manifestations of leadership and success in the public sector. They found direct and indirect effects of participative leadership (also called transformational leadership) on overall performance. From selected Palestinian firms, As-Sadeq and Khoury (2006) claimed that participative leadership depicts the greatest effects on performance factors such as satisfaction, willingness to exert extra efforts and the effectiveness of employees. To explore chain coordinators' leadership practices, Smith (2006) and Ness (2009) focused on retail sectors located in the UK and Norway. They also stated that participative leadership is better. For example, to achieve supply chain coordination objectives, joint leadership works well for Tesco. Another study of more than 400 managers conducted in the UK multiple industries found interesting outcomes. In fact, participative leadership is correlated with chain coordinators' age. Older chain coordinators prefer to participate and consult with followers but younger chain coordinators are happy to make their own decisions (Oshagbemi and Ocholi, 2006). From the Spanish selected firms, Tarı´ et al. (2007) found significant relationships between participative leadership practices and outcomes. Brodt et al., (2006) investigated the US agri-food supply chains (almond and winegrape) and found that participative decision-making with supply chain partners effectively manage resources. It also gives high priority to the preservation of operational quality, which in turn, positively influences environmental sustainability. A study of the US multiple industries conducted by Ling et al. (2008) also found that participative leadership positively affects firm-level outcomes. Although both participative and directive leadership practices are used, participative leadership is strongly related to marketing practices (Ling et al., 2008). Werder and Holtzhausen (2009) stated that both directive and participative leadership are employed at moderate levels in the US public-relationship institutes.

Leadership that emphasizes the participation of chain partners and treats them fairly provides maximum coordination effectiveness among supply chain partners. A significant positive relationship was

found between the leadership approach and performance. The study, which included multiple industries such as food, retail, logistics service, IT, automotive and pharmacy, was conducted in the Netherlands (Leeuw and Berg, 2011). By studying Danish public and private decision makers, it was found that participative leadership is often employed by managers who work in public sectors whereas a directive leadership is mostly employed in private companies (Hansen and Villandsen, 2010). Rendered and Chaudhry (2012) also demonstrated that participative leadership strongly affects performance. The study was conducted in the United Arab Emirates' construction industry. From NZ travel industry, Bentley et al. (2012) found that leadership approaches affect the intention to leave organisations, absenteeism, levels of stress and low levels of emotional wellbeing. Additionally, a study of five selected agri-food chains (dairy, meat, apples, onions and wine) conducted by Akhtar et al. (2012a) explored that participative leadership is often practised in the UK and New Zealand. From the same chains, they also found that directive leadership is used in Pakistan. Nevertheless, their exploratory research did not systematically investigate the effects of leadership choices on the effectiveness of supply chain coordination and its dimensions, leaving the knowledge gap where the current study contributes.

The effectiveness of supply chain coordination depends on the adaption of suitable leadership that fastens front line workforce, board level and trade unions into a connected unit (Jung et al., 2003). It is further believed that chain coordinators' ability to create, develop and maintain good business relationships is the key leadership component. Chain coordinators use multiple leadership strategies and adjust their leadership according to the organizational context, situation and tasks. However, the adaption of a specific leadership approach depends on personal qualities and characteristics that differentiate an effective chain coordinator from an ineffective chain coordinator. The qualities of effective chain coordinators include intelligence, dominance, achievement, self-confidence, participation, honesty, stress tolerance, practicality and constant learning. Chain coordinators who have such qualities also focus on teamwork and relationships management, and they consider chain partners as the key source of their coordination effectiveness. Thus, the qualities and joint decision-making strategy often result in coordination effectiveness among supply chain partners (Smith, 2006; Akhtar et al., 2012a).

The key benefits and high levels of trust in and satisfaction with supply chain partners are associated with participation from supply chain partners rather than a traditionally designed system. Also, their attitude is more favourable, which builds trust and leads towards better service quality and financial performance (Akhtar et al., 2012a). Salamon (2008) also provided evidence that trusted supply chain partners improve service quality, increase sales and build effective coordination.

Outcomes such as effective coordination, good service quality, increased market share and growth in sales are the results of satisfied and trusted supply chain partners. An increase in these outcomes means that they are highly motivated for their business growth, which totally depends on fair and equitable dealings and participative leadership (DeConinck, 2010). However, Bititci et al. (2004) and Werder and

Holtzhausen (2009) believed that directive leadership gives better performance. From the above discussion, the following hypothesis is proposed to answer question 1:

H_1: In the selected New Zealand-UK international agri-food supply chains, as in other chains or countries, participative leadership positively and significantly affects the effectiveness of supply chain coordination while directive leadership does not affect it significantly.

The effectiveness of supply chain coordination consists of operational performance (service and product quality) and social performance (satisfaction with and trust in supply chain partners) significantly affecting financial performance (profit, sales and market share). These performance dimensions were developed by using a number of sources: literature, interviews, pilot testing, statistical tests (please see Akhtar, 2013, pp. 76-80; 136-141). In the interest of brevity and space, the detail cannot be reported here. The linkages between the individual components of these dimensions have been partially reported in some studies. For example, an empirical study of over 200 US manufacturing firms stated a significant positive relationship between service quality and financial performance (Lado et al., 2011). It is also suggested that the factors related to service quality and product quality (delivery on time, order flexibility and fulfilling 100% orders without defective products) are the key operational outcomes, which increase profit, sales and market share (Chen and Paulraj, 2004; Aramyan et al., 2007). In support, Sichtmann et al. (2011) provided evidence that service quality significantly affects financial performance.

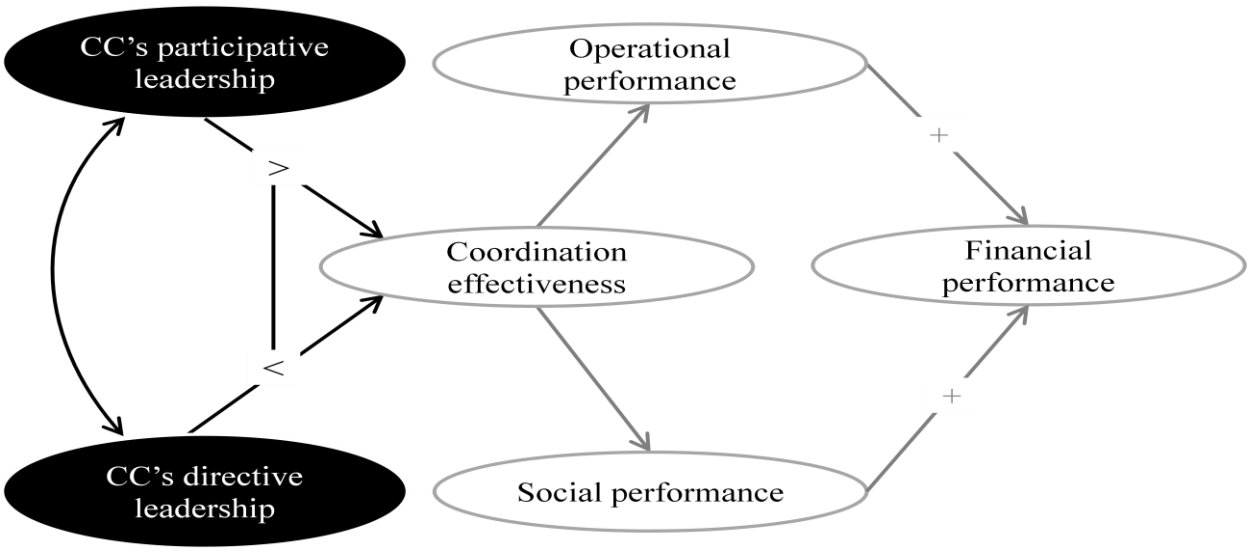
Additionally, social factors such as satisfaction with and trust in supply chain partners seem to be associated with financial performance. Satisfied chain partners continually add value by working together and increase their financial performance (Chatteeuw et al., 2007). Likewise, Olsen et al., (2008) stated that trust is used as a tool to set up and smoothly run businesses. Consequently, it assists to solve coordination problems and creates long-term business relationships that positively affect financial performance (Batt, 2003; Ciliberti et al., 2009). To answer question 2, the above discussion directs towards the following hypotheses.

H_2: There is a significant positive relationship between operational performance and financial performance.

H_3: There is a significant positive relationship between social performance and financial performance.

In summary, a model shown in Figure 1 (also in equations 1 and 2) illustrates the factors and their interrelationship. Chain coordinators' (CCs) participative and directive leadership approaches are treated as independent variables. These variables are the key determinants of the effectiveness of supply chain coordination. The effectiveness of supply chain coordination (coordination effectiveness), a dependent variable, consists of operational and social performance that significantly and positively affects financial performance.

Figure 1 Linkages between leadership and coordination effectiveness



$$Coordination\ effectiveness = \beta_1 * participative\ leadership + \beta_2 * directive\ leadership + \zeta_1 \quad (1)$$

$$Financial\ performance = \beta_3 * operational\ performance + \beta_4 * social\ performance + \zeta_2 \quad (2)$$

3. Methodology

The targeted sample members from Zealand-UK international agri-food supply chains (dairy, meat, apples, onions and wine) were selected. As outlined earlier, the main reason to select these chains was the lack of research in the area. Also, these products / produce play a key role in New Zealand‘s exports, which significanlty contributes to fulfill the local demand in the UK. For the sake of space, the detailed justification is not reported here. However, it can be seen in Akhtar (2013, pp. 1-51; 115-117). For the sample selection, the KOMPASS database was used, which is one of the world's largest business information sources. It is updated monthly and keeps records of more than 2.3 million companies (KOMPASS, 2012).

The literature and a pilot survey (see Akhtar et al., 2012a for detailed pilot survey) led to develop a questionnaire using five-point Likert scales (strongly disagree = 1 and strongly agree = 5). The purpose of this pilot survey was not only to develop the questionnaire, but it also identified chain coordinators / sample members (CEOs, managing directors and head of departments), who were not identified before. Consequently, it did not only reduce the key informant bias but also controlled the study focus. Then, the chain coordinators were facilitated to state their degree of agreement or disagreement. We further tested

the questionnaire and resolved clarity issues. The chain coordinators also mentioned that a questionnaire-based survey was more efficient. We then eventually sent a total of 675 copies of the questionnaire to chain coordinators, UK importers of top five New Zealand agribusiness products: dairy, meat, apples, onions and wine. After excluding the unusable responses (eight), 112 questionnaires yielded a response rate of 17%. The excluded questionnaires were unusable because of incomplete responses or did not fulfil the study criteria. The criteria included a number of chain partners' consultations with chain coordinators for major decision making and number of activities in which chain coordinators were involved (each ≥3). The characteristics of respondents and selected chains are shown in Table I.

Table I Characteristics of respondents and selected chains

Title (chain coordinators)	Freq.	Exp.	Freq.	Edu. (degree)	Freq.	Chains	Freq.
Directors	34	9–16	9	Postgraduate	67	Wine	34
Supply chain managers	27	17–24	13	Undergraduate	41	Meat	31
CEOs	22	25–32	62	A-level/high school	4	Dairy	30
Marketing managers	18	33–40	28	–	–	Onions	10
Channel or chain managers	11	–	–	–	–	Apple	7
Total	112	–	112	–	112	–	112

It is worthwhile to note that the response rate from the UK is, particularly, low if high profile respondents (CEOs, managing directors and head of departments) are the sample members (Draulans et al., 2003; Spriggs et al., 2000; Akhtar et al., 2012a). Thus, a number of efforts were made to increase the response rate. This included using of short and concise statements in the questionnaire, possible in-person visits to collect and deliver the questionnaire, offering incentives, avoiding busy periods of the year, giving enough time to fill in the questionnaire and utilizing university letterheads to explain the study objectives and importance of respondents' participation. Finally, enough sample size was achieved to apply covariance-based structural equation modelling (CBSEM). A number of factors have convinced us to apply the dominating CBSEM approach rather than variance-based SEM, also known under the term partial least squares (PLS) (Reinartz et al., 2009; Kline, 2011; Pandey and Jha, 2012). First, the data was appropriately normal, which helped us to correctly specify the model. Secondly, the complexity of the model was reduced by using parcelling. Thirdly, prior studies have also used and recommended CBSEM even for less than 100 sample size (e.g., Marsh et al., 1998; Goodhue et al., 2007; Akhtar and Fischer, 2014). They reported that the issue of sample size depends on the complexity of a model and the quality of data. Fourthly, our model did not use formative indicators.

The constructs and items used in this research are given in Table AI (Appendix). Each construct consisted of three measures (items) except for product quality and satisfaction – each was assessed using four items. The *participation leadership* assessed to what extent supply chain partners influence supply chain policies and standards. Three items (encouraging uniform procedure, spelling out rights and obligations and providing sufficient guidelines and instructions) reflected *directive leadership*. Mehta et al. (2003) originally used these constructs to measure the leadership approaches in international supply

chains. *The effectiveness of agri-food supply chain coordination*, a dependent variable, consisted of service quality, product quality, trust and satisfaction affecting financial performance. The items (delivery on time, 100% order fulfilment rate and order flexibility) measured service quality were adopted from Aramyan et al. (2007). Product quality assessed product defective rate, product safety, product reliability and an overall impact on natural environment (Amoaka-Gyampah, 2003; Akhtar et al., 2012a). The items used for trust measured chain coordinators' confidence with main partners, the best interest being considered and how often promises were fulfilled (Batt, 2003). Using measures from an earlier study, Cullen et al. (1995), satisfaction with main supply chain partners assessed relationships satisfaction, performance satisfaction, coordination success and how great supply chain partners are in dealings with other supply chain partners. The measures of financial performance were profitability, sales and market growth (Acquaaah, 2007; Akhtar et al., 2012a).

The data analysis includes checking the quality of data, descriptive statistics, reliability and validity tests, exploratory factor analysis, parcelling and structural equation modelling. Descriptive statistics, exploratory factory analysis, parcelling and reliability tests (α) were conducted using SPSS (version 21). AMOS (version 21) was utilized to perform CBSEM.

The quality of our data was assured by satisfying the distributional assumptions (means and medians comparisons; skewness and kurtosis within the suggested limits). The data also supported the reliability and validity criteria recommended by different researchers (e.g., Kline, 2011). Although the items were used from the previous studies, a comprehensive process of exploratory factor analysis (EFA) and CBSEM was used to develop the constructs and to check the linkages. First, EFA with varimax rotations and principal component analysis were performed to extract the factors by using recommended eigenvalues ≥ 1. The scree plots also helped to select the factors. The eigenvalues for directive and participative leadership were 2.56 and 1.98. The factors explained 75.9% of the variance, which is greater than recommended value of 50%. The eigenvalues of service and product quality, financial performance, satisfaction and trust ranged between 2.16 to 2.65. The explained variance of the factors varied from 66.1% to 88.5%. During the process, one item (PRQ4) was deleted because it had low loadings on the intended construct. Moreover, Cronbach α value for each construct was larger than the recommended value of 0.70 (between 0.72 and 0.93), which confirmed the reliability criterion (Kline, 2011). The detailed results are shown in Table AII (Appendix).

Second, a two-stage CBSEM approach was applied. The first stage assessed the measurement models. The second stage estimated hypothesised relationships. The measurement models were first tested for validity. For participative and directive leadership, a non-significant χ^2 (p-value = 0.46) and a set of other measures (NFI, IFI, TLI, CFI and RMSE) showed a close fit. All factor loadings were higher than 0.70 except for PLS1 had loadings of 0.59. The non-significant χ^2 values were estimated for the measurement models of operational (service and product quality), financial (profit, sales and market growth) and social (satisfaction with and trust in supply chain partners) performance. The loadings ranged

between 0.66 and 0.96 with the significant level $\alpha < 0.01$. However, the item (SAT4) had high modification index (6.69) with TRT2. Thus, SAT4 was removed. Furthermore, the values of construct reliability (0.78–0.93) and the average variance extracted (0.54–0.82) were very satisfactory. The detailed results are shown in Table AIII (Appendix). To check non-trivial fit with only three items per scale, measurement models of the effectiveness of coordination were also tested together. The results (i.e., loadings, construct reliability, average variance extracted) were more than satisfactory with a non-significant χ^2 (p-value = 0.85).

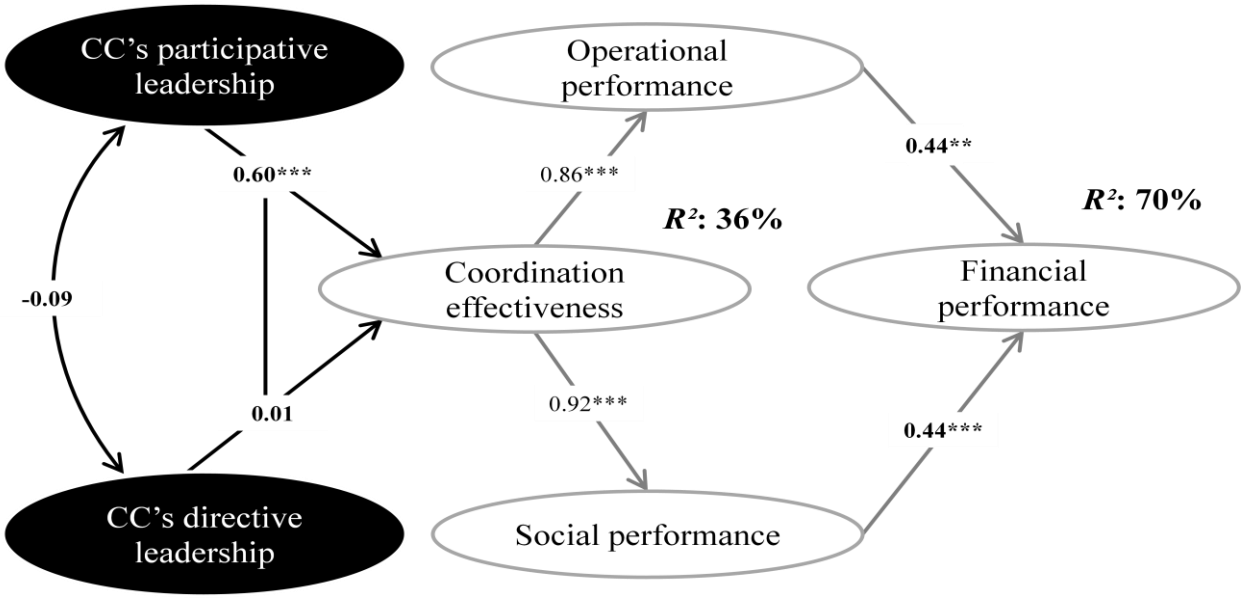
Additionally, the correlation between the respective constructs did not exceed threshold value of 0.85, which means the items assessed different constructs (discriminant validity). Also, the average variance explained (AVE) for each pair of constructs was greater than the square of the correlation between the constructs. Thus, the second method also supported the discriminant validity of our data (Aggelidis and Chatzoglou, 2008; Kline, 2011). The detailed results are shown in Table AIV (Appendix).

Furthermore, the parcelling strategy (operational performance - product quality and service quality; social performance - satisfaction and trust) reduced the number of indicators and helped to achieve the main purpose of this study (investigating the structural relationships between the constructs rather than the relationships between the measurement items). Parcelling can be defined as the process of averaging item scores, which reduces the complexity of a model by estimating fewer parameters (Bandalos and Finney, 2001). Researchers (Yuan et al., 1997; Marsh et al., 1998; Bandalos and Finney, 2001) claimed that the results obtained from parcels rather than the original items are more likely to provide a proper solution. It is also stated that parcelling is particularly appropriate when a study focuses on structural parts rather than items (Kline, 2011). Thus, the structural linkages (hypothesised relationships) were finally tested based on the developed constructs.

4. Findings

The structural results with the standardized coefficients and R^2 values are shown in Figure 2. C*hain coordinators' participative leadership* (*β = 0.60; p = 0.00*) *is an* important determinant for *the effectiveness of supply chain coordination (coordination effectiveness).* Both participative and directive leadership together explain 36% of the variance in the *effectiveness of supply chain coordination.*

Figure 2 SEM results for the linkages between leadership and coordination effectiveness



**** (**) Statistically significant at p < 0.01(<0.05); n = 112*

As far as the linkages between the dimensions of coordination effectiveness are concerned, *operational (service and product quality) and social (trust in and satisfaction with chain partners) performances* are also important for financial performance. The path coefficients for social performance and operational performance are significant at $\beta = 0.44$ ($p = 0.00$) *and* $\beta = 0.44$ ($p = 0.05$) *respectively*. The variables together explain 70% of the variance in financial performance. The standardized coefficients are also provided in equations 3 and 4.

*Coordination effectiveness = 0.60*participative leadership style + 0.01*directive leadership style +* ζ_1 *(3)*

*Financial performance = 0.44*operational performance + 0.44*social performance +* ζ_2 *(4)*

The model fit measures listed in Table II also support the results. A non-significant χ^2 (p = 0.20) jointly with a set of other indices (CFI = 0.99; IFI = 0.99; TLI = 0.99; RMSE = 0.04) showed that the data did fit the model very well.

Table II Recommended and obtained ft indices.

Fit indices	Recommended values	Obtained values
χ^2	–	66.78
Degree of freedom (df)	–	58
χ^2/df	< 5	1.15
P value	> 0.05	0.20
Comparative fit index (CFI)	> 0.95	0.99
Incremental fit index (IFI)	> 0.95	0.99
Tucker Lewis fit index (TLI)	> 0.95	0.99
Root mean square error of approximation (RMSEA)	< 0.06	0.04

Source: Pandey and Jha (2012), Kline (2011), and results of this study

Turning to the research questions and hypotheses, question one asks which leadership approach (participative or directive) shows a significant positive relationship with the effectiveness of agri-food supply chain coordination. This question is answered by H_1, which assumed that chain coordinators' participative leadership positively and significantly affects the effectiveness while directive leadership does not affect it significantly. The results supported the hypothesis - participative leadership has highly significant (***) relationship with the effectiveness of agri-food supply chain coordination. The question two enquires how the dimensions are linked. This question is addressed by H_2 and H_3, which state that there is a significant positive relationship between operational (or social) performance and financial performance. The results showed that there is a highly significant relationship (***) between social performance and financial performance while operational performance shows a significant (**) relationship with financial performance. A summary of the hypotheses that answer the research questions is provided in Table III.

Table III Hypotheses and questions summary

Hypotheses	Supported (yes)	Questions/answers
H_1: In the selected UK international agri-food supply chains, as in other chains or countries, participative leadership positively and significantly affects the effectiveness of supply chain coordination while directive leadership does not affect it significantly.	Yes***	Q_1: Which leadership (participative or directive) shows a significant positive relationship with the effectiveness of agri-food supply chain coordination? A_1: Participative
H_2: There is a significant positive relationship between operational performance and financial performance	Yes**	Q_2: How are the dimensions linked? A_2: Highly significantly or Significantly
H_3: There is a significant positive relationship between social performance and financial performance	Yes***	

***, ** Statistically significant at $p < 0.01$ ($p < 0.05$)

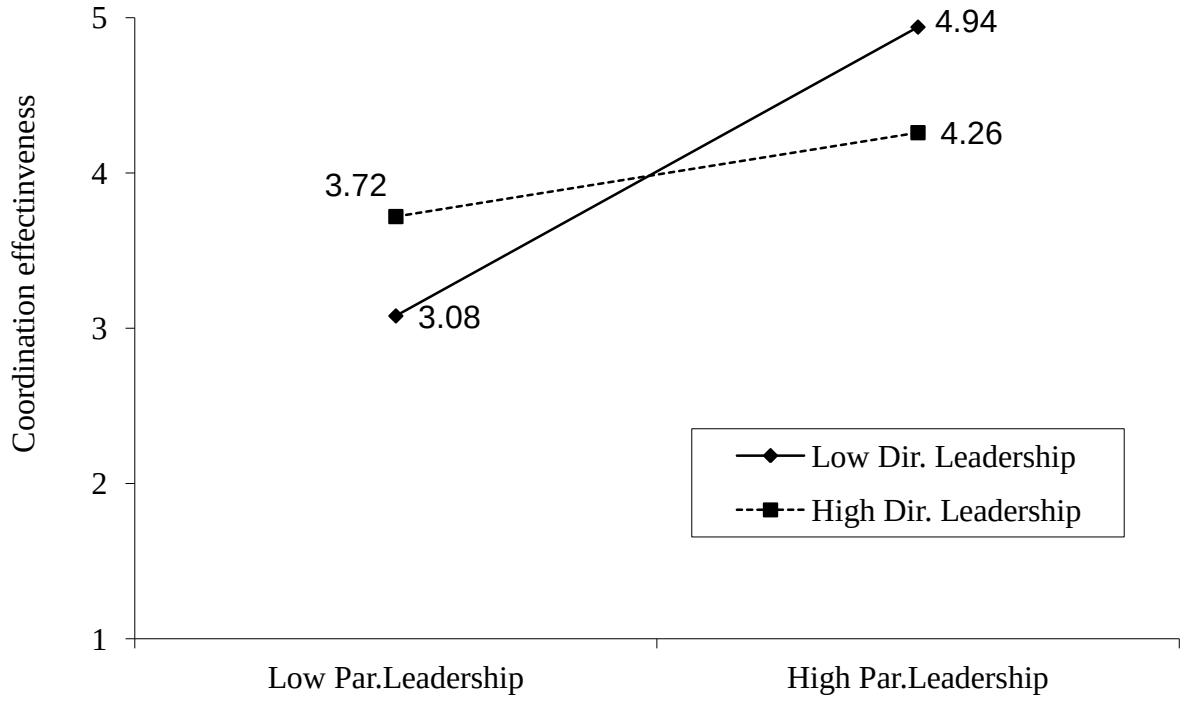
5. Conclusions

This research investigates the effects of chain coordinators' leadership on the effectiveness of agri-food supply chain coordination, which itself consists of operational and social dimensions affecting financial performance. The study also estimates the linkages between these dimensions.

The characteristics of our data (sample size; means, medians, skewness, kurtosis, reliability, validity and EFA) support to apply CBSEM. The results obtained from CBSEM show that participative leadership is (highly) significantly associated with the effectiveness of agri-food supply chain coordination. Also, operational and social dimensions are (highly significant /significant at $p < 0.01, 0.05$) the key determinants for financial performance.

The findings are crucial in the context of the changing leadership approaches in modern agri-food supply chains. Companies often focus on participative leadership that shapes operational (service and product quality) and social (trust in and satisfaction with supply chain partners) outcomes. As a result, these non-financial dimensions positively influence profit, sales and market growth. Our results have strongly supported these linkages. Furthermore, chain coordinators often deal with intra- and extra-organizational coordination, which means their role is to keep supply chains connected and integrated. In this aspect, chain coordinators' participative leadership plays a pivotal role. In other words, chain coordinators who encourage their supply chain partners to participate in decision making show better outcomes. That is why the prior literature (e.g., DeConinck, 2010; Leeuw and Berg, 2011; Akhtar et al., 2012a) supports participative leadership. The literature also provided evidence from certain countries/industries that directive leadership is not significantly associated with the effectiveness of coordination. Our results confirmed this and challenge others (e.g., Bititci et al., 2004; Werder and Holtzhausen, 2009), who believe that directive leadership performs better than participative leadership. We take this analysis one step further by investigating the interaction effect between directive and participative leadership, which has not been investigated by previous studies on this topic. The orthogonalising approach recommended by Henseler and Chin (2010) was followed to conduct this analysis. The interaction depicts a negative significant ($p = 0.00$) relationship with the effectiveness of agri-food supply chain coordination. As illustrated in Figure 3, the companies are categorized into high or low (directive and participative) leadership intensity. These two groupings have significant difference in their coordination effectiveness: companies with high participative and low directive leadership (4.94) versus with low participative and low directive leadership (3.08); companies with high participative and high directive leadership (4.26) versus firms with low participative and high directive leadership (3.72). These results conclude that the largest benefit in the effectiveness of international agri-food supply chain coordination comes when companies use low directive and high participative leadership.

Figure 3 Interaction effect on coordination effectiveness



The management and policy implications resulted from this study are threefold. First, participative leadership seems to be the future of modern international agri-food supply chains, where the workers are more knowledgeable and coordination of supply chains is led by information and communication technologies. This means that they are able to make more effective and informed decisions. Also, the activities in international agri-food chains are becoming more complex and demanding. Thus, timely-decentralized decision making and participative practices will be expected as a leading advantage. Second, the findings suggest that the concepts of operational and social performances are becoming more important to achieve financial objectives. In the model, operational and social performances serve as the powerful determinants for financial performance. Thus, if chain coordinators focus on operational and social outcomes, they will generate better financial results. Thereby, financial and nonfinancial outcomes simultaneously work and that is a message that chain coordinators should consider, particularly in international supply chains. Third, chain coordinators from developing countries need to be more careful as they often use directive leadership, which might not work in developed countries. This may not only affect supply chain outcomes but also puts their contracts at risk.

References

Acquaah, M. 2007, "Managerial social capital, strategic orientation and organizational performance in emerging economy", *Strategic Management Journal*, Vol. 28 No. 12, pp. 1235-1255.

Aggelidis, V.P. and Chatzoglou, P.D. 2008, "Using a modified technology acceptance model in hospitals", *International Journal of Medical Informatics*, Vol. 78 No. 2, pp. 115-126.

Akhtar, P. Fischer, C. and Marr, N.E. 2011, "Improving the effectiveness of food chain coordinators: a conceptual model", *Acta Horticulturae*, Vol. 895, 15-21.

Akhtar, P. Marr, N.E. and Garnevska, E. 2012a, "Chain coordinators and their role in selected agrifood supply chains: lessons from pakistan, new zealand and united kingdom", *Food Chain Journal*, Vol. 2, No. 1,104-116.

Akhtar, P. Marr, N.E. and Garnevska, E. 2012b, "Coordination in humanitarian relief chains: chain coordinators", *Journal of Humanitarian Logistics and Supply Chain Management* , Vol. 2, No. 1, pp. 85-103.

Akhtar, P. (2013). Determinants of coordination effectiveness of selected international agri-food supply chains: a structural equation modelling approach, *PhD thesis*, School of Engineering and Advanced Technology, Massey University, New Zealand, available at: http://mro.massey.ac.nz/handle/10179/4522 (assessed 13 August 2013).

Akhtar, P., and Fischer, C., (2014) "Supervision environments and performance of UK dairy warehouses: a path analysis", *British Food Journal*, Vol. 116 No: 6, pp.1000-1013

Amoaka-Gyampah, K. 2003, "The relationships among selected business environment factors and manufacturing strategy: insights from an emerging economy", *The Journal of Management Science*, Vol. 31 No. 4, pp. 287-301.

Aramyan, H.L. Lansink, O.A. Vorst, V.J. and Kooten, V.O. 2007, "The performance measurement system in agri-business supply chains: a case study", *Supply Chain Management: an International Journal*, Vol. 12 No. 4, pp. 304-315.

As-Sadeq H. and Khoury, G. 2006, "Leadership styles in the Palestinian large-scale industrial enterprises", Journal *of Management Development*, Vol. 25 No. 9, pp. 832-849.

Bandalos, D.L. and Finney, S.J. 2001, "Item parcelling issues in structural equation modelling. In: Marcoulides G.A., Schumacker, R.E., *Advanced Structural Equation Modelling: New Developments and Techniques*. Lawrence Erlbaum Associates Inc., NJ.

Batt, P.J. 2003, "Building trust between growers and market agents", *Supply Chain Management: an International Journal*, Vol. 8 No. 1, 65-78.

Bentley, T. Catley, B. Cooper-Thomas, H. Gardner, D. Driscoll, M. Dale, A. and Trenberth, L. 2012, "Perceptions of workplace bullying in the New Zealand travel industry: prevalence and management strategies", *Tourism* Management, Vol. 33 No. 2, 351-360.

Bernroider, E. and Schmöllerl, P. 2013, "A technological, organizational, and environmental analysis of decision making methodologies and satisfaction in the context of IT induced business transformations", *European Journal of Operational Research*, Vol. 224 No. 1, pp. 141-153.

Bititci, U. Mendibil, K. Nudurupati, S. Turner, T. and Garengo, P. 2004, "The interplay between performance measurement, organizational culture and management styles", *Measuring Business Excellence*, Vol. 8, No. 3, pp. 28-41.

Brodt, S. Klonsky, K. and Tourte, L. 2006, "Farmer goals and management styles: implications for advancing biologically based agriculture", *Agricultural Systems*, Vol. 89 No. 1, pp. 90-105.

Chatteeuw, F. Fileen, E. and Vodnerhourst, J. 2007, "Employee engagement: boosting productivity in turbulent times", *Organization Development Journal*, Vol. 25 No. 2, pp. 151-155.

Chen, J.I. and Paulraj, A. 2004, "Towards a theory of supply chain management: the constructs and measurements", *Journal of Operations Management*, Vol. 22 No.2, pp. 119-150.

Ciliberti, F. Goot, D.G. Haan, D.J. and Pontrandolfo, P. 2009, "Codes to coordinate supply chains: SMEs' experiences with SA8000", *Supply Chain Management: an International Journal*, Vol. 14 No. 2, pp. 117-127.

Cullen, J.B. Johnson, J.L. and Sakano, T. 1995, "Japanese and local partner commitment to IJVs: psychological consequences of outcomes and investments in the IJV relationship", *Journal of International Business Studies,* Vol. 26 No.1, pp. 91-115.

DeConinck, J. 2010, "The effect of organizational justice, perceived organizational support, and perceived supervisor support on marketing employees' level of trust", *Journal of Business Research,* Vol. 63 No. 12, pp. 1349-1355.

Draulans, J. Deman, A.P. and Volberda, H.W. 2003, "Building alliance capability: management techniques for superior alliance performance", *Long Range* Planning, Vol. 3 No. 2, pp. 151-166.

Gallos, V.J. and Heifetz, A.R. 2008, "*Business Leadership* (2nd ed.)", A Jossey-Bass Reader, John Wiley and Sons, CA.

Goodhue, D. Lewis, W. and Thompson, R. 2007, "Statistical power in analyzing interaction effects: questioning the advantage of PLS with product indicators", *Information Systems Research,* Vol. 18 No. 2, pp. 211-227.

Hansen, J. and Villadsen, A. 2010, "Comparing public and private managers' leadership styles: understanding the role of job context", *International Public Management Journal,* Vol. 13 No. 3, pp. 247-274.

Henseler, J. and Chin, W., 2010, "A comparison of approaches for the analysis of interaction effects between latent variables using partial least squares", *Structural Equation Modeling: A Multidisciplinary Journal,* Vol. 17 No. 1, pp. 82-109.

Ichniowski, C. Kohcan, T. Levine, D. Olson, C. and Strauss, G. 1996, "What works at work: overview and assessment of industrial relations?", *A Journal of Economy and Society,* Vol. 35 No. 3, pp. 299-333.

Jung, D. Chow, C. and Wu, A. 2003, "The role of transformational leadership in enhancing organizational innovation: hypotheses and some preliminary findings", *The Leadership Quarterly,* Vol. 14 No. 4-5, pp. 525-544.

Kline, R.B. 2011, "*Principles and Practice of Structural Equation Modelling (3rd ed.,)*", The Guilford Press, USA.

KOMPASS. 2012, What KOMPASS gives you access to, available at: http://www.caul.edu.au/content/upload/files/datasets/kompass2008.pdf (assessed 04 June 2012).

Karami, A. Analoui, F. and Kakabadse, K. 2006, "The CEOs' characteristics and their strategy development in UK SME sector", *Journal of Management Development,* Vol. 25 No. 4, pp. 316-324.

Kruglanski, A. Pierro, A. and Higgins, E. 2007, "Regulatory mode and preferred leadership styles: how fit increases job satisfaction", *Basic and Applied Social Psychology,* Vol. 29 No. 2, pp. 137-149.

Lado, A. Paulraj, A. and Chen, I. 2011, "Customer focus, supply-chain relational capabilities and performance", *The International Journal of Logistics Management,* Vol. 22, No. 2, pp. 202-221.

Leeuw, S. and Berg, J. 2011, "Improving operational performance by influencing shop floor behaviour via performance management practices", *Journal of Operations* Management, Vol. 29 No. 3, pp. 224-235.

Ling, Y. Simsek, Z. Lubatkin, M. and Veiga, J. 2008, "Transformational leadership role in promoting corporate entrepreneurship: examining the CEO-TMT interface", *Academy of Management Journal*, Vol. 51 No. 3, pp. 557-576.

Marsh, H.W. Hau, K.T. Balla, J.R. and Grayson, D. 1998, "Is more ever too much? The number of indicators per factor in confirmatory factor analysis", *Multivariate Behavioral Research*, Vol. 33 No. 2, pp. 181-220.

Mehta, R. Dubinsky, A. and Anderson, R. 2003, "Leadership style, motivation and performance in international marketing channels", *European Journal of Marketing*, Vol. 37 No. 1/2, pp. 50-85.

Ness, H. 2009, "Governance, negotiations and alliance dynamics: explaining the evolution of relational practice", *Journal of Management Practice*, Vol. 46 No. 3, pp. 451-478.

Olsen, J. Harmsen, H. and Friis, A. 2008, "Product development alliances: factors influencing formation and success", *British Food Journal*, Vol. 110 No. 4/5, pp. 430-443.

Oshagbemi, T. and Ocholi, A.S. 2006, "Leadership styles and behaviour profiles of managers", *Journal of Management Development*, Vol. 25 No. 8, pp 748-762.

Pandey, M. and Jha, A. 2012, "Widowhood and health of elderly in India: examining the role of economic factors using structural equation modelling", *International Review of Applied Economics*, Vol. 26 No. 1, pp. 111-124.

Parry, K. and Proctor-Thomson, S. 2003, "Leadership, culture and performance: the case of the New Zealand public sector", *Journal of Change Management*, Vol. 3 No. 4, pp. 376-399.

Pfeffer, J. 1998, "Seven practices of successful organizations", *California Management Review*, Vol. 40 No. 2, pp. 96-123.

Rendered, K. and Chaudhry, A. 2012, "Leadership-style, satisfaction and commitment: an exploration in the United Arab Emirates' construction sector", *Engineering Construction and Architectural Management Electronic Resource*, Vol. 19 No. 1, pp. 61-85.

Reinartz, W., Haenlein, M., and Henseler, J., 2009. "An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of Research in Marketing*, Vol. 26 No. 4, pp. 332-344.

Salamon, S. 2008, "Trust that binds: the impact of collective felt trust on organizational performance", *Journal of Applied Psychology*, Vol. 93 No. 3, pp. 593-601.

Sichtmann, C. Selasinsky, M. and Daimantopoulos, A. 2011, "Service quality and export performance of business-to-business service providers: the role of service employee and customer-oriented quality control initiatives", *Journal of International Marketing*, Vol. 19 No. 1, pp. 1-22.

Smith, L.G.D. 2006, "The role of retailers as channel captains in retail supply chain change: the example of Tesco", (*PhD thesis*, University of Stirling).

Spriggs, J. Hobbs, J. and Fearne, A. 2000, "Beef producer attitudes to coordination and quality assurance in Canada and the UK", *International Food and Agriculture Management Review,* Vol. 3 No. 1, pp. 95-109.

Tarı´, J.J. Molina, J.F. and Castejo´n J.F. 2007, "The relationship between quality management practices and their effects on quality outcomes", *European Journal of Operational Research,* Vol. 183 No. 2, pp. 483-501.

Wall, T.D. Kemp, N.J. Jackson, P.R. and Clegg, C.W. 1986, "Outcomes of autonomous workgroups: a long-term field experiment", *Academy of Management Journal,* Vol. 29 No. 2, pp. 280-304.

Werder, K. and Holtzhausen, D., 2009, "An analysis of the influence of public relations department leadership style on public relations strategy use and effectiveness", *Journal of Public Relations Research,* Vol. 21 No. 4, pp. 404-427.

Yuan, K.H. Bentler, P.M. and Kano, Y. 1997, "On averaging variables in a CFA model", *Behaviormetrika,* Vol. 24 No. 1, pp. 71-83.

Appendix

Table AI Constructs used for this study

Construct and studies	Item description	Codes
Participative leadership (Mehta et al., 2003)	• SC partners influence determination of policies	PLS1
	• SC partners do not pass ideas decision making (*)	PLS2
	• We allow our SC partners to decide allowances/promotions	PLS 3
Directive leadership (Mehta et al., 2003)	• We encourages to use uniform procedures	DLS1
	• We do not spell out rights and obligations (*)	DLS2
	• We provides sufficient guidelines & instructions	DLS3
Service quality (Aramyan et al., 2007)	• Provide deliveries on time	SRQ1
	• Do not fulfil 100% orders with accuracy (*)	SRQ 2
	• Offer very flexible options for changing orders' quantity	SRQ 3
Product quality (Amoaka-Gyampah, 2003; Akhtar et al., 2012)	• Product defective rate is very low	PRQ1
	• Provide100% products safety certification	PRQ2
	• Very reliable products are not offered (*)	PRQ3

	• Impact of practices on natural environment is reducing	PRQ4
Satisfaction with main chain partners (Cullen et al., 1995)	• Relationships with main SC partners are satisfactory	SAT1
	• Our main partners are not good companies for business (*Rev)	SAT 2
	• Are satisfied with main-partners' performance	SAT 3
	• Have successful coordination with main partners	SAT 4
Trust in main chain partner (Batt, 2003)	• Do not have high confidence in main partners (*)	TST1
	• Main partners always consider our best interests	TST2
	• Main partners do not always keep their promises (*)	TST3
Financial performance (Aramyan et al., 2007; Akhtar et al., 2012)	• Profitability growth is high	FIN1
	• Sales growth is increasing	FIN2
	• Market share growth is reducing (*)	FIN3

**: Items reversed. The constructs used in this research were compiled from the previous studies mentioned above and adjusted to the purpose of this study. In other words, the constructs employed in this investigation are not exactly the same as described in the literature.*

Table AII Exploratory factor analysis results and reliability

Items codes	Loadings*	Eigenvalues**	Variance*	Reliability (α)***
Directive and participative leadership				
DLS1	0.92			
DLS2	0.91	2.56		0.89
DLS3	0.90			
PLS1	0.76		75.90	
PLS2	0.88	1.98		0.77
PLS3	0.84			
Service quality				
SRQ1	0.81			
SRQ2	0.86	2.16	72.02	0.72
SRQ3	0.86			
Product quality				
PRQ1	0.86			
PRQ2	0.84	2.23	74.20	0.83
PRQ3	0.86			

PRQ4	Deleted because of low loading in its intended construct			
Financial performance				
FNP1	0.89			
FNP2	0.92	2.49	83.12	0.89
FNP3	0.93			
Satisfaction (with main chain partners)				
SAT1	0.75			
SAT2	0.80			
SAT3	0.88	2.64	66.10	0.83
SAT4	0.82			
Trust (in main chain partners)				
TRT1	0.95			
TRT2	0.95	2.65	88.46	0.93
TRT3	0.93			

**Loadings and variance > 0.50 recommended; ***Eigenvalues *> 1.0 recommended; ***reliability> 0.70 recommended*

Table AIII evaluation of measurement models

Constructs	Item codes	Loadings	Const. Reliability*	Ave. variance extracted**
Directive leadership	DLS1	0.91	0.90	0.75
	DLS2	0.84		
	DLS3	0.84		
Participative leadership	PLS1	0.59	0.78	0.54
	PLS2	0.87		
	PLS3	0.72		
Service quality	SRQ1	0.69	0.81	0.59
	SRQ2	0.79		
	SRQ3	0.81		
Product quality	PRQ1	0.83	0.83	0.62
	PRQ2	0.76		
	PRQ3	0.76		
Financial performance	FNP1	0.80	0.90	0.75

	FNP2	0.88		
	FNP3	0.91		
Satisfaction (with main partners)	SAT1	0.66	0.79	0.55
	SAT2	0.73		
	SAT3	0.83		
Trust (in main chain partners)	TRT1	0.96	0.93	0.82
	TRT2	0.86		
	TRT3	0.90		

**CR= $\Sigma\lambda_i^2/(\Sigma\lambda_i^2 + \Sigma(1-\lambda_i^2)) > 0.70$ recommended; ** VE = $\Sigma\lambda_i^2/(\Sigma\lambda_i^2 + \Sigma(1-\lambda_i^2)) > 0.50$ recommended*

Table AIV Discriminant validity of the constructs

Constructs	(ϕ)	(ϕ^2)	AVE	*AVE > ϕ^2*
Directive and participativ Leadership	-0.09	0.01	(0.75+0.54)/2 = 0.65	*Yes*
Service and product quality	0.76	0.58	(0.59+0.62)/2 = 0.61	*Yes*
Satisfaction and trust	0.81	0.66	(0.55+0.82)/2 = 0.69	*Yes*