Examining the relationship between chain governance structures and chain performance
An empirical evidence of the dairy sector

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Abstract

Purpose – The purpose of this paper is to analyze the influence of chain governance on chain performance among the chain members.

Design/methodology/approach – The survey was conducted in a triadic context with 345 chain members (115 dairy farmers, 115 dairy cooperative managers, and 115 processors) of the dairy sector in Uganda. Data collection was performed through simple random sampling by survey questionnaires with the chain executives. SEM was used for data analysis.

Findings – The results revealed several chain governance structures (spot market, relational, contractual and mini integration) confirmed the hypothesized correlations on chain performance at different chain levels. The authors found a positive influence of relational governance on chain performance for all the chain members; however, the effect is stronger at the first supplier chain level.

Originality/value – This triadic chain approach makes an original contribution to the chain governance structures and chain performance literature in the supply chain context. Studies analyzing all aspects of chain governance structure and chain performance at three chain levels are limited.

Keywords Triad, Dairy sector, Chain governance structures, Chain performance

Paper type Research paper

1. Introduction

The literature on chain governance structure has received significant attention, this topic has been widely studied considering the analysis of inter-organizational relationships as a multi-dimensional phenomenon, which is embedded in the supplier–buyer relationships and processes (Dolci *et al.*, 2017). Over the last two decades, the concept of governance has also been

applied to the supply chain area (Cai *et al.*, 2011; Claro *et al.*, 2003; Zhang and Aramyan, 2009; Ferguson *et al.*, 2005; Mesic *et al.*, 2018; Huang *et al.*, 2018). In these studies, it has been either referred to as supply chain governance or relationship quality. In this paper, the governance structure is defined as the institutional arrangements within which transactions are negotiated and executed (Williamson, 1991). The term chain governance structures focuses on adopting an uncertain environment to enhance performance. Therefore, the evaluation of effectiveness and efficiency of chain governance structures involves using metrics related to various performance objectives such as cost, responsiveness, flexibility and quality (Zhang and Aramyan, 2009). In contrast to chain performance, we propose that chain governance is concerned with the balance between long-term relational decisions and interdependency that exists among supplier–buyer relationships (Richey Jr *et al.*, 2010).

In addition, elements of chain governance are presented with different classification in the extant literature (Kataike and Gellynck, 2018). For example, a contract is classified as a mechanism (Yu *et al.*, 2006), and as a structure (Raynaud *et al.* (2005), while incentive is defined as a mechanism (Wathne and Heide, 2004; Kashyap *et al.*, 2012). The same applies to relational governance, where proxies have been used, such as trust (Poppo *et al.*, 2016; Chen *et al.*, 2013), informal ties (Stouthuysen *et al.*, 2017), social control (Osmonbekov *et al.*, 2016), and cooperation or solidarity (Fałkowski *et al.*, 2017). The previous literature also shows that there are several dimensions of governance, but none have defined this concept precisely as distinguishable multiple components and elements (Wacker *et al.*, 2016; Dolci *et al.*, 2017; Chen *et al.*, 2017). Therefore, the contributions of several studies are isolated, and proxy constructs have been used when considering necessary elements of chain governance structures, which can improve chain performance (Chen *et al.*, 2004).

Notably, researchers have used different governance structures ranging within a continuum from market ("buy") to vertical integration ("make") to explain coordination in food chains (Gellynck and Molnár, 2009; Raynaud *et al.*, 2005; Schulze *et al.*, 2007; Wever *et al.*, 2010). In particular, Gellynck and Molnár (2009) depicted product, chain level and country-specific characteristics of governance structures used in European food chains. Wever *et al.* (2012) proposed a framework that includes price, volume, quality and investments to assess governance structures. Raynaud *et al.* (2005) use six types of governance structures following a hierarchical sequence namely, spot market, relational contract, relational contract with an approved partner, formal written contract, equity-based contract and vertical integration to analyze their alignment between quality. Schulze *et al.* (2007) present a typology of governance structures used in pork chains: spot market, long-term, relationships, marketing contracts, production contracts, farming contracts and vertical integration.

Despite the vastness of research dealing with chain governance and chain performance, most of the literature has paid little attention to the complexity of governance structures that underlie chain performance in triadic agri-food chains. Therefore, the contribution of this paper is quadruple. First, most of the literature deal with either the governance part or the performance part overlooking the correlation between the two concepts. For example, the study by Gellynck and Molnár (2009) focused on the determinant factors of the chain governance structure in the European food sector without relating to chain performance.

Second, the exception that discusses the relationship between chain governance structure and chain performance lack completeness particularly in governance structure constructs and the level of chain analysis. Instead of using various forms of governance structures, they limit their investigation on only one or two. Examples of such studies include Birthal *et al.* (2017), who examined contractual and relational governance and their association with profitability and efficiency. Similarly, Poppo *et al.* (2016) discussed the impact of contracts and trust on supplier performance. Abdi and Aulakh (2017) carried out an explorative study that addressed the relational and contractual governance in relation to mutual relationship strengthening. Han *et al.* (2011) attempted to explore the association between transaction costs on spot market,

contractual and relational and quality management of the pork processors. Panayides and Lun (2009) analyzed the influence of trust on the innovativeness aspect of chain performance and found that there are positive effects of trust on the innovativeness of the supply chains.

Third, some studies on chain governance and chain performance focused on conceptual framework developments and systematic reviews which need to be supported by empirical evidence. For instance, studies reported by Zhang and Aramyan (2009) and Aramyan *et al.* (2006) and could be mentioned as an example in regard to the conceptual framework, and Cao and Lumineau (2015) and Kataike and Gellynck (2018) are examples of literature reviews.

Finally, many empirical studies on chain governance structures and performance have been focusing on individual firms in a supply chain (Srinivasan *et al.*, 2011; Sezen, 2008; Min and Mentzer, 2004) or on the dyads (Birthal *et al.*, 2017; Nyaga *et al.*, 2013; Han *et al.*, 2011; Srinivasan *et al.*, 2011) Dyadic level chain analysis collects data from two firms of a dyad, the focal company and either an upstream or a downstream firm to the focal company (Capaldo and Giannoccaro, 2015; Burkert *et al.*, 2012; Yang *et al.*, 2011; Yang *et al.*, 2010; Benton and Maloni, 2005). According to previous research, chain analysis of a supply chain at a dyadic level does not bring out the underlying dimensions of the entire chain (Odongo *et al.*, 2016; Kühne *et al.*, 2013; Mentzer *et al.*, 2001). Consequently, researchers have an increasing interest in evaluating the chain governance structure and performance of triads (Molnár *et al.*, 2010; Holma, 2012). However, owing to a rather complicated data collection based on a triadic approach, there are only a few papers applying this approach, especially in the agri-food sector. Therefore, to contribute to this field, this research paper attempts to investigate the interface between chain governance structures and chain performance in triad agri-food chains.

This paper is organized as follows. Section 2 is a theoretical framework and the derived research hypotheses. Section 3 details the adopted methodology, Section 4 the analysis and presentation of the findings, Section 5 the discussion and interpretation of obtained findings and Section 6 discusses the managerial implications. Section 7 provides concluding remarks and study limitations to shape the future research agenda.

2. Theoretical framework and hypotheses
Three theoretical perspectives are suggested through which the concepts chain governance structures and chain performance can be viewed. First, the transaction cost theory (TCT) predicts that the most efficient governance structures are those that minimize production and transaction costs considering the institutional environment wherein (Williamson, 2000; Ménard and Valceschini, 2005). The institutional environment is where formal and informal rules are set in order to reduce uncertainties and transaction costs. This suggests that simple governance structures should be used in conjunction with simple contractual relations and complex governance structures are reserved for complex relations (Williamson, 1979; Zhang and Aramyan, 2009). The theory argues that well-established contractual governance could be an effective mechanism to control exchange hazards by specifying each party's roles in both stable and changing environments (Cao and Lumineau, 2015).

Second, the resource-based view (RBV) theory presents a broader understanding of the influence of resources on performance (Wernerfelt, 1984; Cabrera-Suárez *et al.*, 2001; Grant, 1996; Barney and Clark, 2007). RBV assumes that tangible and intangible resources will provide a sustainable competitive advantage when they are valuable to the firm (e.g. dairy coolers, pasteurizer, need-based training) (Barney *et al.*, 2001). This theory sees resources as having a dynamic influence on sustained competitive advantage (Helfat and Peteraf, 2003). These authors argue that firms adapt their resources over time to the different stages of their capability life cycle. Rungtusanatham *et al.* (2003) suggest that the linkages between buyers and suppliers are key resources for decisions such as "make or- buy" in the supply chain.

The third theory is the relational exchange theory, which highlights relational norms such as trust, solidarity and cooperation of the chain members' relationships. Chain partners are expected to behave according to the shared relational norms (Heide, 1994; Wathne *et al.*, 2018; Aulakh *et al.*, 1996; Palmatier *et al.*, 2007). Thus, relational norms are also considered as an effective type of governance in existing buyer–supplier relationship literature (Zhang and Aramyan, 2009; Zhou and Xu, 2012; Xie *et al.*, 2016). The existing literature on chain governance structures and performance, and these three main theories are often used concurrently. the TCT is traditionally used to support the effectiveness of contractual governance, whereas RBV considers integration or buy decisions. Finally, the above mentioned three theories are directly related to different forms of chain governance structure to influence performance.

Research hypotheses and conceptual model
Spot market and chain performance. Market governance with classical contracting for non-specific transactions often happens in the spot market where demand and supply are determined by prices (Zhang and Aramyan, 2009). In spot market arrangements, suppliers are likely to act opportunistically in order to realize a short-term profit from the transaction (Gyau and Spiller, 2008). Against this background, chain partners may generally incur some costs as a way to safeguard themselves against the possible opportunistic attitudes. Hence, transaction costs may increase and the overall economic performance may be reduced. Therefore, we hypothesize that:

H1. Spot market transactions are negatively related to chain performance.

Relational governance and chain performance. Relational governance arises from the presence of trust due to long-time commitment among the chain members. Arranz and Arroyabe (2012) noted that relational norms are more forceful in improving performance because long-time commitment reduces costs associated with recurrent disputes, posturing and renegotiations. Likewise, Yang *et al.* (2012) observed that relational governance has a positive and significant effect on the channel performance of the exporters. As reported by Morgan and Hunt (1994), when both commitment and trust are present, they produce outcomes that promote efficiency, productivity and effectiveness. Lui *et al.* (2009) found that relational mechanisms are likely to be more effective in improving the performance between companies in a supply chain that has a long-term relationship. The following hypothesis is set to be tested:

H2. Relational governance is positively related to chain performance.

Contractual governance and chain performance. Contractual governance is legal enforcement in the form of written contracts used to govern the transaction whose performance and behavioral standards are specified in the contract (Wever *et al.*, 2010). Ferguson *et al.* (2005) found that contractual governance is positively associated with the performance but to a much lesser extent. Performance may be affected when detailed contracts are used without a well-developed social relationship (Cannon *et al.*, 2000). Contracts are also a way of providing guarantees to companies in the agri-food chains and ensuring conformity in the performed actions (Ferguson *et al.*, 2005; Paulin *et al.*, 1997). In a current investigation, Dolci *et al.* (2017) identified a significant and positive relationship between contractual governance and chain performance. The following hypothesis will be tested:

H3. Contractual governance is positively related to chain performance.

Mini integration and performance. Mini integrations (MIs) are arrangements coordinated by big processors by means of formal or informal agreements with dairy cooperatives. In these

transactions, the integrators may allocate equipment and technical support in production, depending on the farming stage and type of agreement (Martins *et al.*, 2017). MIs are stronger resource control and coordination mechanisms associated with hierarchies and power are more effective in dealing with difficulties related to the performance of the agri-food chains (Ruzzier, 2009). Firms integrate to build entry barriers, facilitate investments in specialized assets, protect product quality, and improve scheduling and coordination (Williamson, 1975). We propose the following hypothesis:

H4. MI is positively related to chain performance (Figure 1).

3. Methodology
Measurement scale of the questionnaire
In this paper, the endogenous variable chain performance is generally measured subjectively and objectively (Dawes, 1999). An objective way of measuring performance is based on objective data or the financial indicators of enterprises (e.g. profits, inventory and turnover) (Mesic *et al.*, 2018). However, many agri-food companies are often unwilling to release information on the financial operations of their company (Collins and Collins, 2001). In this regard, Ward *et al.* (1994) suggested the subjective way of measuring the performance, which is based on the respondents' subjective perception of the chain performance (Covin and Slevin, 1989). Previous studies have shown that perceived assessments are consistent with objective performance (Molnár *et al.*, 2010; Vickery *et al.*, 2003; Odongo *et al.*, 2016). An appropriate measuring instrument is required for the subjective performance measurement, which will quantitatively show how successful the agri-food chain is and whether there is a potential for improving chain performance (Cohen and Roussel, 2005). The construct chain performance was measured by four key indicators illustrated in Table I.

In order to operationalize this framework, we ensured transparency and rigor in the research process, a survey protocol was adopted to guide the research advocated by Yin (2013). A set of theoretical propositions were derived from the theoretical framework to design the questionnaire and guide the data collection process. The key data collection tool was a questionnaire administered to the chain members. In a survey, the protocol plays an important role in ensuring reliability, providing information so that the research, which is repeated under the same conditions, obtains the same results (Yin, 2013). The protocol used in the survey was developed in consideration with the chain governance elements and chain performance variables mentioned in Tables I and II. Thus, the content of the survey included questions to understand each of the variables of chain governance structures and chain performance, to verify the variables that emerge from literature (Kataike and
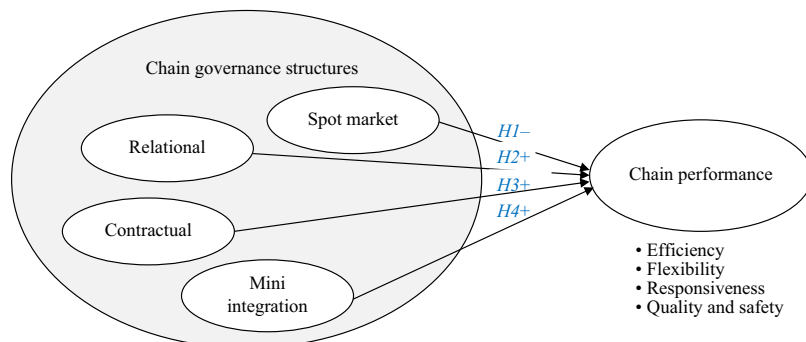

Figure 1.
Conceptual model

Construct	Item	Code	Author (s)
Chain performance		CP	
Efficiency	Reduced production cost	EFF1	Neely (1999), Molnár *et al.* (2010), Beamon (1999),
	Reduced distribution cost	EFF2	Chopra *et al.* (2017), Aramyan *et al.* (2007), Kühne
	Reduced storage cost	EFF3	*et al.* (2013), Fattahi *et al.* (2013), Grunert (2005)
	Return on investment	EFF4	
	Profitability	EFF5	
Responsiveness	Time lead	RES1	Gunasekaran *et al.* (2001) (Aramyan *et al.*, 2007),
	Customer complaint	RES2	Beamon (1999)
	Response time	RES3	
	Fill rate	RES4	
	Delivery errors	RES5	
Quality and safety	Reduced defect rate	QTY1	Fattahi *et al.* (2013), Aramyan *et al.* (2007),
	Safety	QTY2	Chopra *et al.* (2017), Gellynck *et al.* (2008),
	Healthy	QTY3	Gunasekaran *et al.* (2004), Chen *et al.* (2004)
	Package quality	QTY4	
Flexibility	Volume flexibility	FLE1	Aramyan *et al.* (2007), Fattahi *et al.* (2013),
	Delivery flexibility	FLE2	Neely (1999)
	Response to competition	FLE3	
	New requirements	FLE4	

Table I.
Constructs, items and
code used for
endogenous variable

Construct	Item	Code	Author (s)
Chain governance		CGS	
Spot market	Identify irrelevant	SMKT1	Gyau and Spiller (2008), Han *et al.* (2011),
	Price incentive	SMKT2	Zhang and Aramyan (2009)
	Immediate sells	SMKT3	
	Own resources	SMKT4	
	Any customer	SMKT5	
Relational	Trust	RGS1	Arranz and Arroyabe (2012), Chen *et al.* (2013),
	Cooperation	RGS2	Morgan and Hunt (1994), Ferguson *et al.* (2005),
	Commitment	RGS3	Han *et al.* (2011), Hoetker and Mellewigt (2009),
	Relationship	RGS4	Yang *et al.* (2012), Dolci *et al.* (2017),
	Collaboration	RGS5	Zhou and Poppo (2010)
Contracts	Incentives	CGS1	Poppo and Zhou (2014), Zhang and Hu (2011),
	Power	CGS2	Wang *et al.* (2011), Houston and Johnson (2000),
	Settle conflicts	CGS3	Hoetker and Mellewigt (2009), Dolci *et al.* (2017)
	Control	CGS4	
	Rights and oblig.	CGS5	
Mini integration	Resource control	MIGS1	Gyau and Spiller (2008), Ruzzier (2009),
	Joint planning	MIGS2	Williamson (1975), Buvik and Andersen (2002),
	Joint decisions	MIGS3	Rothaermel *et al.* (2006)
	Share resources	MIGS4	
	Follow rules	MIGS5	
	Mutual benefits	MIGS6	
	Joint production plan	MIGS7	

Table II.
Constructs, item and
code used for
exogenous variable

Gellynck, 2018). Therefore, the protocol used in this study was developed to investigate the relationship between chain governance structures and chain performance, particularly focusing on the following specific research questions:

RQ1. How do spot market transactions affect chain performance?

RQ2. What is the association between relational governance and chain performance?

RQ3. Is there a significant relationship between contractual governance and chain performance?

*RQ4.* How does MI affect chain performance?

Data collection
Through simple random sampling, a survey was conducted with 345 supply chain members: 115 first suppliers, 115 second suppliers and 115 buyers. The aim of the simple random sample was to reduce the potential for human bias in the selection of cases to be included in the sample. As a result, the simple random sample provided us with a sample that is highly representative of the population being studied. We obtained a sampling frame from the data manager at a dairy development authority containing all dairy cooperatives/second suppliers forming a population from which a sample was taken. Research participants from the first supplying firm included farm owners because they deemed appropriate informants being familiar with the daily operations. They also have regular interactions with the senior managers of the second supplying firm. We began our data collection with the complete list of all second suppliers working for the first supplier and the buyer. The second supplier provided responses to measurement items pertaining to the buyer and the first supplier. In the context of this study, supplier-initiated triads have their origin in a decision by the supplier to use a third party to mediate and/or support the exchange with the customer/buyer. For instance, dairy farmers decide to work with primary cooperatives in direct contact with the processors (Wynstra *et al.*, 2015; Mena *et al.*, 2013).

Data analysis
First, from the qualitative information presented in Tables I and II, a quantitative questionnaire was designed and pre-tested (Malhotra and Birks, 2007). Second, reflective indicators were analyzed to generate reliability and exploratory convergent factor analysis was applied to refine the preliminary questionnaire with Varimax orthogonal rotation method (Hair *et al.*, 2014). The ratings from the α of constructs and the instrument were over 0.6, which is considered satisfactory for investigatory research (Hair *et al.*, 2006). Factor loadings below 0.5 were discarded, as recommended by Gratz and Roemer (2004). Thus, the construct contractual governance items CGS2 and CGS4 were eliminated, equally for spot market and MI, and two items were deleted for each as indicated in Table II. Therefore, the original 26 items turned out to be 19, since 7 items were deleted during model specification as illustrated in the measurement model in Figure 2. The Kaiser–Meyer–Olkin sample adequacy tests and Bartlett's test of sphericity provided acceptable ratings of 0.825 with a significance level of 0.00, respectively. This suggests that important correlations exist between items.

Third, confirmatory factor analysis based on SEM was analyzed. A sample size close to 200 respondents is enough to use SEM, and the model's stability would be really doubtful when the ratio between the number of subjects and parameters is less than 5:1, according to Kline (1998). Therefore, the pooled sample for the proposed measurement model with 47 parameters was estimated and 460 cases were satisfactory to assess model fit through a specific measurement model software for SEM (AMOS 22), which, thus, defined the measurement model with the constructs and respective items. Convergent validity is the next step, which means the observation of the ratings and the standardized factor values. To evaluate the adequacy of the ratings and unidimensionality, standardized residual covariance and modification indexes were analyzed.

Fourth, discriminant validity, the relationship between the average variance extracted (AVE) and the square of the correlation between the factors was computed. All values were according to those recommended by Hair *et al.* (2017). Finally, construct reliability, the AVE and the composite reliability of each construct were calculated. All values were over 0.5 for
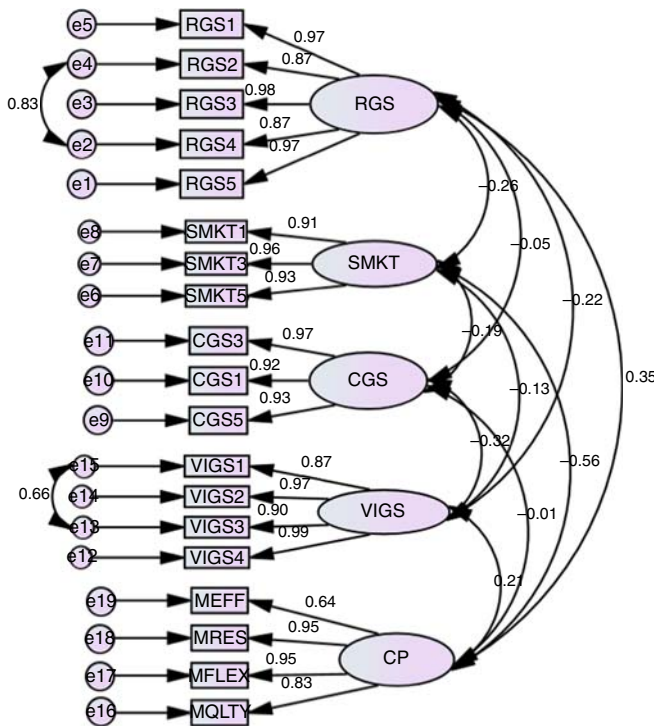
Notes: $n=460$. Model fit statistics are: $\chi^2/df=1.869$, RMSEA$=0.044$,
GFI$=0.944$, AGFI$=0.924$, CFI$=0.970$, NFI$=0.978$, IFI$=0.970$

Figure 2.
Revised measurement
model pooled sample

the AVE and over 0.7 for composite reliability, showing the measurement model to be reliable. Also, the adjustment indexes were calculated, based upon the revised measurement model. All values were considered acceptable. We can observe the final measurement model with the indexes in Figure 2 and Table III, respectively.

4. Results
According to the research methodology set, the main research findings are presented in five sections: reliability and validity scores of the questionnaire are presented in Table III; the measurement model for the total sample is presented as Figure 2 and a full SEM for total sample demonstrated in Figure 3; the model fit indices for each subsample is presented in Table IV; and the path coefficients for testing the hypotheses are presented in Table V of each sample. Finally, the structural models related to the hypothesis are appended.

Based on the satisfactory CFA result for the measurement model, a full SEM was run first for the total sample (Model 1) and then for the four subgroups of chain members. The tested Model 1 summarizes the chain governance structures and their relationships on chain performance as shown in Figure 3. In general, this model performed well as indicated by the goodness-of-fit indices $\chi^2/df=2.387$, CFI$=0.947$, RMSEA$=0.051$, GFI$=0.900$, NFI$=0.936$, IFI$=0.948$ and AGFI$=0.901$. The standardized estimates for Model 1 indicated that relational governance and MI positively influence chain performance. With regard to the spot market, there is a significant negative impact on chain performance. Remarkable was the

Construct	Code	Mean	SD	Variance	α	CR	AVE
Relational							
	RGS1	3.13	1.51	2.97			
	RGS2	3.77	1.48	2.19	0.976	0.821	0.69
	RGS3	4.10	1.39	1.98			
	RGS4	3.76	1.44	2.23			
	RGS5	3.80	1.49	2.09			
Mini integration							
	MIGS3	2.51	1.51	2.30			
	MIGS1	2.44	1.50	2.26	0.907	0.889	0.70
	MIGS4	2.50	1.62	2.63			
	MIGS2	2.49	1.57	2.47			
Contractual							
	CGS1	2.00	1.35	1.82			
	CGS3	2.00	1.34	1.79	0.956	0.854	0.68
	CGS5	1.97	1.38	1.91			
Spot market							
	SMKT1	1.85	1.14	1.31			
	SMKT3	187	1.16	1.34	0.952	0.892	0.71
	SMKT5	2.00	1.10	1.24			
Chain performance							
	EFF	4.29	0.84	0.71			
	RES	4.31	0.88	0.78	0.906	0.835	0.68
	FLE	4.32	0.87	0.78			
	QTY	4.31	0.81	0.67			

Note: $n = 460$

Table III.
Descriptive analysis of variables for the pooled sample

insignificant relationship between contractual governance and chain performance. The coefficients were too small, suggesting that formal contracts do not predict the dairy chain performance. It is possibly due to weak legal enforcement for such a perishable product (milk).

For the subgroups, a significant and strong relationship between different path estimates was observed. This kind of modeling allows the simultaneous estimation of a series of distinct multiple equations, which are related to each other based on the used theory and
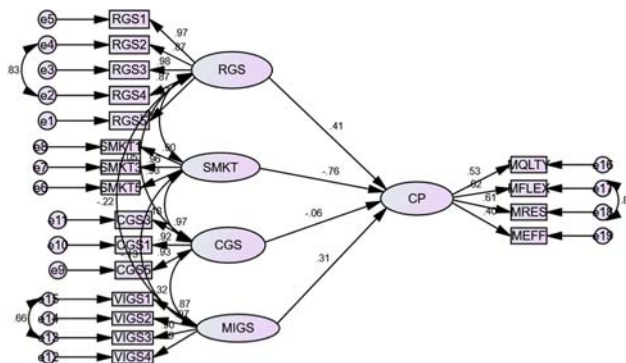
Figure 3.
Total sample summarizing the link between chain governance structures and chain performance

Notes: Model fit statistics are: $\chi^2/df = 2.387$, RMSEA $= 0.051$, GFI $= 0.910$, AGFI $= 901$, CFI $= 0.947$; NFI $= 0.936$, IFI $= 0.948$

theoretical references. The summary of all fit indexes and path coefficients of the structural models is presented in Tables IV and V. It is worth mentioning that in the subgroups' structural models, we used reflective models because, according to Hair *et al.* (2006), measures are expected to be correlated with internal consistency reliability. In this case, dropping an indicator from the model does not alter the meaning of the construct and it takes the measurement error into account at the item level (Jarvis *et al.*, 2003).

5. Discussion

The paper provides several important findings for the relationship between chain governance structures and chain performance for the Ugandan dairy sector. Empirical evidence shows that *H1* was partially supported. First suppliers and Second suppliers at their downstream observed a significant and positive influence of spot market on chain performance. The result builds on the findings of Gyau and Spiller (2008), who observed a positive correlation between the spot market and performance (i.e. cost reduction, financial success and satisfaction). On the contrary, buyers observed an insignificant and negative link between spot market and chain performance. This finding is in accordance with previous research (Han *et al.*, 2011; Wever *et al.*, 2010). It can be attributed to the fact that spot market dairy suppliers often act opportunistically in order to realize short-term profits. This result is expected because Ugandan dairy processors (buyer) prefer more coordinated chain governance structures with their suppliers (Trienekens *et al.*, 2018; Gyau and Spiller, 2008; Williamson, 1991; Hobbs and Young, 2000).

The interaction between relational governance and chain performance (*H2*) predicted a significant and positive effect on all models. Chain members with a long-term relationship and trust are identified as being able to achieve better performances (Dolci *et al.*, 2017). This result is expected as previous research in the agribusiness sector has shown that trust is a critical determinant of a good performing relationship (Mesic *et al.*, 2018; Molnár *et al.*, 2010; Odongo *et al.*, 2016; Koopmans *et al.*, 2018). According to Wacker *et al.* (2016), relational governance displays positive influence on performance. Furthermore, Sezen and Yilmaz (2007) report that chain members build their relationships based on mutual trust because exchange relationships with a high level of trust and commitment provide each chain actor more benefits and profits than it can be obtained in a non-trust governance mechanism.

Fit indexes	Acceptable range	Model 1	Model 2	Model 3	Model 4	Model 5
χ^2/df	⩽3.0	2.381	2.595	1.983	*4.617*	1.710
RMSEA	⩽0.08	0.051	0.065	0.057	0.074	0.069
GFI	⩾0.90	0.910	*0.891*	0.900	0.901	0.910
AGFI	⩾0.90	0.901	*0.884*	*0.893*	*0.899*	0.900
CFI	⩾0.90	0.974	0.945	0.944	0.942	0.960
NFI	⩾0.90	0.936	0.914	0.933	0.930	0.916
IFI	⩾0.90	0.948	0.945	0.944	0.942	0.960

Table IV.
Fit indexes of the structural models of independent samples

Path	First suppliers Estimates	p	Second supplier upstream Estimates	p	Second supplier downstream Estimates	p	Buyers Estimates	p
SMKT → CP	0.38	***	−0.77	***	0.79	***	−0.08	
MIGS → CP	−0.37	***	−0.12	–	0.27	**	0.50	***
RGS → CP	0.70	***	0.37	***	0.39	***	0.26	**
CGS → CP		–	−0.06	–	0.24	**	0.15	

Notes: **$p = 0.05$; ***$p = 0.001$

Table V.
Summary of the results for the subgroups' structural models

The results of this study partially observe a positive and significant influence of contractual governance and chain performance, which partially supports *H3* downstream suppliers). The finding is in agreement with Dolci *et al.* (2017), who argue that the control of activities is essential for achieving performance that faces changes over time. The control of processes in the dairy value chain is crucial for improving performance (Dolci *et al.*, 2017). Formal contracts are used by cooperative managers as mechanisms that attempt to mitigate risk and uncertainty in exchange relationships (Lusch and Brown, 1996). A clear contract ensures that transaction terms and conditions are effectively enforceable (Ring and Van De Ven, 1992). When conflicts arise among chain partners, solutions are provided through a contract which is lawful.

On the other hand, we observed an insignificant path for the first suppliers and second suppliers in estimating the influence of contractual governance on chain performance. This finding is in agreement with Schulze *et al.* (2007), who observed an insignificant link between contractual governance and performance in a German pork supply chain. Although contracts provide effective safeguards for the chain partners to protect themselves from the chain partner's opportunism, they are also expensive to implement effectively (Macneil, 1977; Williamson, 1985). Therefore, incomplete contracts which consist of moral hazards, information hold-up and opportunism significantly increase transaction costs (Huang *et al.*, 2014). The insignificance of contractual governance is likely due to the fact that the dairy farmers are not convinced of the benefits of the formal exchange arrangements. Birthal *et al.* (2017) also observed that formal structure suffers from low compliance rates probably due to weak legal institutions and enforcement mechanisms.

The findings provide partial support for *H4*. It is observed that MI influences chain performance, which improves efficiency, responsiveness, quality and flexibility for the downstream buyers and the upstream second suppliers. In Uganda, mini integrated transactions are arrangements coordinated by dairy processors mostly by means of informal or formal agreements with the second suppliers. In these transactions, the integrator allocates production equipment, such as milk coolers, milk tanks for transportation, and provides technical support in production, depending on the type of agreement with the chain partner. This is especially important for the dairy sector where small-scale producers are dominant. Therefore, the majority of processors depend on MI with second suppliers. Similarly, our findings are in line with the results of Zhou *et al.* (2015), who found that collaborative and integrated activities minimize opportunism within the chain partners.

On the other hand, the first suppliers perceived a negative and significant link between MI and chain performance, whereas, for the second suppliers, it is insignificant. This indicates that chain members do not receive sufficient technical support or mutual benefit and their join decisions are not considered by the downstream chain members. Previous studies have found that the same degree of integration can have a different impact on the firm performance depending on whether the share distribution of the leading firms reflects clear leadership or similar market share positions (Ruzzier, 2009). This should be a point of improvement in the future because stronger resource control and coordination mechanisms associated with hierarchies are more effective in dealing with difficulties related to the performance of the agri-food chains (Trifković, 2016).

6. Managerial implications
The reported findings have relevant implications for policy makers and managers. According to the findings, chain members can use the result of the study to take certain measures which improve the performance of the chains they are affiliated to. It was observed that relational governance performs better; therefore, strengthening and maintaining long-term relationships is very important for chain partners. It is also necessary to establish trust and commitment within the chain relationships. Collaborative actions and the presence of trust within the chain partners are key aspects to create

integration and, in the end, lead to gains for all the parties involved. Furthermore, the establishment of a good reputation based on trust can be achieved by greater concern for the economic satisfaction of the chain partners (Mesic *et al.*, 2018).

When contracts are not overly applied due to other legal and institutional constraints, the downstream chain managers face challenges to reduce the complexity of transactions along the chain. Therefore, the policy makers must develop formal control infrastructure to help buyers and suppliers solidify the chain members' collective interests, which can reduce opportunism and the conflicts of individual members. Still, suppliers and buyers use relational governance to improve chain performance with their chain partners. The Ugandan dairy actors should also use formal contracts to improve transaction within the dairy sector. The alignment of both chain governance structures is more effective than the use of only one. All chain members, especially the downstream suppliers and buyers, should commit to exercising the optimal combination of both governance mechanisms (Huang *et al.*, 2014). As pointed out by Liu *et al.* (2009), managers should combine different elements of chain governance to improve chain performance. A similar case is seen in Toyota's supplier system in Japan (Dyer and Chu (2003). The appropriate usage of formal contracts exerts a significant influence indeed to improve chain performance. However, the usage of formal control should be carefully evaluated and flexibly used to avoid strict contract regulations and monitoring *ex post* costs. Furthermore, adaptable formal control activities that can concurrently contribute to fostering social control should be listed in the chain management principles (Huang *et al.*, 2014).

7. Limitations of the study and final remarks

Besides the conceptual contribution of this paper, the main strength of this study pertains to its large triad sample, including three chain members at different chain levels. The focus on chain level analysis and data collection from minimum three firms of chains as opposed to dyadic chain level contributes to the limited number of triadic studies (Mesic *et al.*, 2018; Molnár *et al.*, 2010; Odongo *et al.*, 2016). This study investigated 115 triads and benchmarked chain performance within the dairy sector, and compared 460 chain members' perceptions. The data were collected from a single country; more specifically, the study was conducted in Uganda, thereby filling the gap of limited research attention in developing countries in Sub-Saharan Africa. More so, the empirical contribution of this study also lies in the choice of the food sector. The dairy sector has also received very little attention in scientific literature. Consequently, there was a need to extend the focus of the dairy industry to downstream and upstream chain members to increase awareness of both the individual and chain competitiveness and performance.

Despite the paper contributions, some limitations are worthy to be acknowledged, which open up opportunities for further research. First, our findings are based on a single survey collecting quantitative data, and the result can only testify to the situations of three subgroups with different forms of governance structures and performance; it does not study multiple chains. A multiple chain analysis research design should be considered for future studies to clearly draw out the relationship between chain governance structures and chain performance across several food sectors. Second, another limitation of this research is the fact that the sample is located in only one country (Uganda), which reduces the potential generalization of the results. Future research can consider multiple countries with the same context. Third, although this research contributes by providing additional confirmation of the relationships between chain governance structures and chain performance, control variables, such as the length of relationship, income, level of education and production units, were not analyzed to measure the causality between CGS and CP from different perspectives. As for further research, we would recommend studies to analyze the phenomenon to estimate the moderating effect of control variables.

References

Abdi, M. and Aulakh, P.S. (2017), "Locus of uncertainty and the relationship between contractual and relational governance in cross-border interfirm relationships", *Journal of Management*, Vol. 43 No. 3, pp. 771-803.

Aramyan, L., Ondersteijn, C., Kooten, O. and Oude Lansink, A. (2006), "Performance indicators in agri-food production chains", *Quantifying the Agri-Food Supply Chain*, pp. 49-66.

Aramyan, L.H., Oude Lansink, A.G., Van Der Vorst, J.G. and Van Kooten, O. (2007), "Performance measurement in agri-food supply chains: a case study", *Supply Chain Management: An International Journal*, Vol. 12 No. 4, pp. 304-315.

Arranz, N. and Arroyabe, J. (2012), "Effect of formal contracts, relational norms and trust on the performance of joint research and development projects", *British Journal of Management*, Vol. 23 No. 4, pp. 575-588.

Aulakh, P.S., Kotabe, M. and Sahay, A. (1996), "Trust and performance in cross-border marketing partnerships: a behavioral approach", *Journal of International Business Studies*, Vol. 27 No. 5, pp. 1005-1032.

Barney, J., Wright, M. and Ketchen, D.J. Jr (2001), "The resource-based view of the firm: ten years after 1991", *Journal of Management*, Vol. 27 No. 6, pp. 625-641.

Barney, J.B. and Clark, D.N. (2007), *Resource-Based Theory: Creating and Sustaining Competitive Advantage*, Oxford University Press on Demand.

Beamon, B.M. (1999), "Measuring supply chain performance", *International Journal of Operations & Production Management*, Vol. 19 No. 3, pp. 275-292.

Benton, W. and Maloni, M. (2005), "The influence of power-driven buyer/seller relationships on supply chain satisfaction", *Journal of Operations Management*, Vol. 23 No. 1, pp. 1-22.

Birthal, P.S., Chand, R., Joshi, P., Saxena, R., Rajkhowa, P., Khan, M.T., Khan, M.A. and Chaudhary, K.R. (2017), "Formal versus informal: efficiency, inclusiveness, and financing of dairy value chains in Indian Punjab", *Journal of Rural Studies*, Vol. 54, pp. 288-303.

Burkert, M., Ivens, B.S. and Shan, J. (2012), "Governance mechanisms in domestic and international buyer-supplier relationships: an empirical study", *Industrial Marketing Management*, Vol. 41 No. 3, pp. 544-556.

Buvik, A. and Andersen, O. (2002), "The impact of vertical coordination on ex-post transaction costs in domestic and international buyer-seller relationships", *Journal of International Marketing*, Vol. 10 No. 1, pp. 1-24.

Cabrera-Suárez, K., De Saá-Pérez, P. and García-Almeida, D. (2001), "The succession process from a resource- and knowledge-based view of the family firm", *Family Business Review*, Vol. 14 No. 1, pp. 37-48.

Cai, S., Yang, Z. and Jun, M. (2011), "Cooperative norms, structural mechanisms, and supplier performance: empirical evidence from Chinese manufacturers", *Journal of Purchasing and Supply Management*, Vol. 17 No. 1, pp. 1-10.

Cannon, J.P., Achrol, R.S. and Gundlach, G.T. (2000), "Contracts, norms, and plural form governance", *Journal of the Academy of Marketing Science*, Vol. 28 No. 2, pp. 180-194.

Cao, Z. and Lumineau, F. (2015), "Revisiting the interplay between contractual and relational governance: a qualitative and meta-analytic investigation", *Journal of Operations Management*, Vol. 33, pp. 15-42.

Capaldo, A. and Giannoccaro, I. (2015), "How does trust affect performance in the supply chain? The moderating role of interdependence", *International Journal of Production Economics*, Vol. 166, pp. 36-49.

Chen, C., Zhu, X., Ao, J. and Cai, L. (2013), "Governance mechanisms and new venture performance in China", *Systems Research and Behavioral Science*, Vol. 30 No. 3, pp. 383-397.

Chen, I.J., Paulraj, A. and Lado, A.A. (2004), "Strategic purchasing, supply management, and firm performance", *Journal of Operations Management*, Vol. 22 No. 5, pp. 505-523.

Chen, P.-Y., Chen, K.-Y. and Wu, L.-Y. (2017), "The impact of trust and commitment on value creation in asymmetric buyer-seller relationships: the mediation effect of specific asset investments", *Journal of Business & Industrial Marketing*, Vol. 32 No. 3, pp. 457-471.

Chopra, S., Laux, C., Schmidt, E. and Rajan, P. (2017), "Perception of performance indicators in an agri-food supply chain: a case study of India's public distribution system", *International Journal on Food System Dynamics*, Vol. 8 No. 2, pp. 130-145.

Claro, D.P., Hagelaar, G. and Omta, O. (2003), "The determinants of relational governance and performance: how to manage business relationships?", *Industrial Marketing Management*, Vol. 32 No. 8, pp. 703-716.

Cohen, S. and Roussel, J. (2005), *Strategic Supply Chain Management: The 5 Disciplines for Top Performance*, McGraw Hill Professional.

Collins, J.C. and Collins, J. (2001), *Good to Great: Why Some Companies Make the Leap… and Others Don't*, Random House.

Covin, J.G. and Slevin, D.P. (1989), "Strategic management of small firms in hostile and benign environments", *Strategic Management Journal*, Vol. 10 No. 1, pp. 75-87.

Dawes, J. (1999), "The relationship between subjective and objective company performance measures in market orientation research: further empirical evidence", *Marketing Bulletin-Department of Marketing*, Massey University, Vol. 10, pp. 65-75.

Dolci, P.C., Maçada, A.C.G. and Paiva, E.L. (2017), "Models for understanding the influence of supply chain governance on supply chain performance", *Supply Chain Management: An International Journal*, Vol. 22 No. 5, pp. 424-441.

Dyer, J.H. and Chu, W. (2003), "The role of trustworthiness in reducing transaction costs and improving performance: empirical evidence from the United States, Japan, and Korea", *Organization Science*, Vol. 14 No. 1, pp. 57-68.

Fałkowski, J., Chlebicka, A. and Łopaciuk-Gonczaryk, B. (2017), "Social relationships and governing collaborative actions in rural areas: some evidence from agricultural producer groups in Poland", *Journal of Rural Studies*, Vol. 49, pp. 104-116.

Fattahi, F., Nookabadi, A.S. and Kadivar, M. (2013), "A model for measuring the performance of the meat supply chain", *British Food Journal*, Vol. 115 No. 8, pp. 1090-1111.

Ferguson, R.J., Paulin, M. and Bergeron, J. (2005), "Contractual governance, relational governance, and the performance of interfirm service exchanges: the influence of boundary-spanner closeness", *Journal of the Academy of Marketing Science*, Vol. 33 No. 2, pp. 217-234.

Gellynck, X. and Molnár, A. (2009), "Chain governance structures: the European traditional food sector", *British Food Journal*, Vol. 111 No. 8, pp. 762-775.

Gellynck, X., Molnár, A. and Aramyan, L. (2008), "Supply chain performance measurement: the case of the traditional food sector in the EU", *Journal on Chain and Network Science*, Vol. 8 No. 1, pp. 47-58.

Grant, R.M. (1996), "Toward a knowledge-based theory of the firm", *Strategic Management Journal*, Vol. 17 No. 52, pp. 109-122.

Gratz, K.L. and Roemer, L. (2004), "Multidimensional assessment of emotion regulation and dysregulation: development, factor structure, and initial validation of the difficulties in emotion regulation scale", *Journal of Psychopathology and Behavioral Assessment*, Vol. 26 No. 1, pp. 41-54.

Grunert, K.G. (2005), "Food quality and safety: consumer perception and demand", *European Review of Agricultural Economics*, Vol. 32 No. 3, pp. 369-391.

Gunasekaran, A., Patel, C. and McGaughey, R.E. (2004), "A framework for supply chain performance measurement", *International Journal of Production Economics*, Vol. 87 No. 3, pp. 333-347.

Gunasekaran, A., Patel, C. and Tirtiroglu, E. (2001), "Performance measures and metrics in a supply chain environment", *International Journal of Operations & Production Management*, Vol. 21 Nos 1/2, pp. 71-87.

Gyau, A. and Spiller, A. (2008), "The impact of supply chain governance structures on the inter-firm relationship performance in agribusiness", *Zemedelska Ekonomika-Praha-*, Vol. 54 No. 4, p. 176.

Hair, J., Black, W., Babin, B. and Anderson, R. (2014), *Exploratory Factor Analysis. Multivariate Data Analysis*, 7th Pearson new international ed., Pearson, Harlow.

Hair, J.F. Jr, Babin, B.J. and Krey, N. (2017), "Covariance-based structural equation modeling in the journal of advertising: review and recommendations", *Journal of Advertising*, Vol. 46 No. 1, pp. 163-177.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2006), *Multivariate Data Analysis*, Vol. 6, Pearson Prentice Hall, Upper Saddle River, NJ.

Han, J., Trienekens, J.H. and Omta, S.O. (2011), "Relationship and quality management in the Chinese pork supply chain", *International Journal of Production Economics*, Vol. 134 No. 2, pp. 312-321.

Heide, J.B. (1994), "Interorganizational governance in marketing channels", *The Journal of Marketing*, pp. 71-85.

Helfat, C.E. and Peteraf, M.A. (2003), "The dynamic resource-based view: capability lifecycles", *Strategic Management Journal*, Vol. 24 No. 10, pp. 997-1010.

Hobbs, J.E. and Young, L.M. (2000), "Closer vertical co-ordination in agri-food supply chains: a conceptual framework and some preliminary evidence", *Supply Chain Management: An International Journal*, Vol. 5 No. 3, pp. 131-143.

Hoetker, G. and Mellewigt, T. (2009), "Choice and performance of governance mechanisms: matching alliance governance to asset type", *Strategic Management Journal*, Vol. 30 No. 10, pp. 1025-1044.

Holma, A.-M. (2012), "Interpersonal interaction in business triads – case studies in corporate travel purchasing", *Journal of Purchasing and Supply Management*, Vol. 18 No. 2, pp. 101-112.

Houston, M.B. and Johnson, S.A. (2000), "Buyer–supplier contracts versus joint ventures: determinants and consequences of transaction structure", *Journal of Marketing Research*, Vol. 37 No. 1, pp. 1-15.

Huang, H.-C., Cheng, T., Huang, W.-F. and Teng, C.-I. (2018), "Impact of online gamers' personality traits on interdependence, network convergence, and continuance intention: perspective of social exchange theory", *International Journal of Information Management*, Vol. 38 No. 1, pp. 232-242.

Huang, M.-C., Cheng, H.-L. and Tseng, C.-Y. (2014), "Reexamining the direct and interactive effects of governance mechanisms upon buyer-supplier cooperative performance", *Industrial Marketing Management*, Vol. 43 No. 4, pp. 704-716.

Jarvis, C.B., Mackenzie, S.B. and Podsakoff, P.M. (2003), "A critical review of construct indicators and measurement model misspecification in marketing and consumer research", *Journal of Consumer Research*, Vol. 30 No. 2, pp. 199-218.

Kashyap, V., Antia, K.D. and Frazier, G.L. (2012), "Contracts, extracontractual incentives, and ex-post behavior in franchise channel relationships", *Journal of Marketing Research*, Vol. 49 No. 2, pp. 260-276.

Kataike, J. and Gellynck, X. (2018), "22 Years of governance structures and performance: what has been achieved in agrifood chains and beyond? A review", *Agriculture*, Vol. 8 No. 4, p. 51.

Kline, R.B. (1998), "Software review: Software programs for structural equation modeling: Amos, EQS, and LISREL", *Journal of Psychoeducational Assessment*, Vol. 16 No. 4, pp. 343-364.

Koopmans, M.E., Rogge, E., Mettepenningen, E., Knickel, K. and Šūmane, S. (2018), "The role of multi-actor governance in aligning farm modernization and sustainable rural development", *Journal of Rural Studies*, Vol. 59, pp. 252-262.

Kühne, B., Gellynck, X. and Weaver, R.D. (2013), "The influence of relationship quality on the innovation capacity in traditional food chains", *Supply Chain Management: An International Journal*, Vol. 18 No. 1, pp. 52-65.

Liu, Y., Luo, Y. and Liu, T. (2009), "Governing buyer-supplier relationships through transactional and relational mechanisms: evidence from China", *Journal of Operations Management*, Vol. 27 No. 4, pp. 294-309.

Lui, S.S., Wong, Y.-y. and Liu, W. (2009), "Asset specificity roles in interfirm cooperation: reducing opportunistic behavior or increasing cooperative behavior?", *Journal of Business Research*, Vol. 62 No. 11, pp. 1214-1219.

Lusch, R.F. and Brown, J.R. (1996), "Interdependency, contracting, and relational behavior in marketing channels", *The Journal of Marketing*, pp. 19-38.

Macneil, I.R. (1977), "Contracts: adjustment of long-term economic relations under classical, neoclassical, and relational contract law", *Northwestern University Law Review*, pp. 72-854.

Malhotra, N.K. and Birks, D.F. (2007), *Marketing Research: An Applied Approach*, Pearson Education.

Martins, F.M., Trienekens, J. and Omta, O. (2017), "Governance structures and coordination mechanisms in the Brazilian pork chain–diversity of arrangements to support the supply of piglets", *International Food and Agribusiness Management Review*, pp. 1-22.

Mena, C., Humphries, A. and Choi, T.Y. (2013), "Toward a theory of multi-tier supply chain management", *Journal of Supply Chain Management*, Vol. 49 No. 2, pp. 58-77.

Ménard, C. and Valceschini, E. (2005), "New institutions for governing the agri-food industry", *European Review of Agricultural Economics*, Vol. 32 No. 3, pp. 421-440.

Mentzer, J.T., Dewitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D. and Zacharia, Z.G. (2001), "Defining supply chain management", *Journal of Business Logistics*, Vol. 22 No. 2, pp. 1-25.

Mesic, Ž., Molnár, A. and Cerjak, M. (2018), "Assessment of traditional food supply chain performance using a triadic approach: the role of relationships quality", *Supply Chain Management: An International Journal*, Vol. 23 No. 5, pp. 396-411.

Min, S. and Mentzer, J.T. (2004), "Developing and measuring supply chain management concepts", *Journal of Business Logistics*, Vol. 25 No. 1, pp. 63-99.

Molnár, A., Gellynck, X. and Weaver, R. (2010), "Chain member perception of chain performance: the role of relationship quality", *Journal on the Chain and Network Science*, Vol. 10 No. 1, pp. 27-49.

Morgan, R.M. and Hunt, S.D. (1994), "The commitment-trust theory of relationship marketing", *The Journal of Marketing*, pp. 20-38.

Neely, A. (1999), "The performance measurement revolution: why now and what next?", *International Journal of Operations & Production Management*, Vol. 19 No. 2, pp. 205-228.

Nyaga, G.N., Lynch, D.F., Marshall, D. and Ambrose, E. (2013), "Power asymmetry, adaptation and collaboration in dyadic relationships involving a powerful partner", *Journal of Supply Chain Management*, Vol. 49 No. 3, pp. 42-65.

Odongo, W., Dora, M., Molnár, A., Ongeng, D. and Gellynck, X. (2016), "Performance perceptions among food supply chain members: a triadic assessment of the influence of supply chain relationship quality on supply chain performance", *British Food Journal*, Vol. 118 No. 7, pp. 1783-1799.

Osmonbekov, T., Osmonbekov, T., Gregory, B., Gregory, B., Chelariu, C., Chelariu, C., Johnston, W.J. and Johnston, W.J. (2016), "The impact of social and contractual enforcement on reseller performance: the mediating role of coordination and inequity during adoption of a new technology", *Journal of Business & Industrial Marketing*, Vol. 31 No. 6, pp. 808-818.

Palmatier, R.W., Dant, R.P. and Grewal, D. (2007), "A comparative longitudinal analysis of theoretical perspectives of inter-organizational relationship performance", *Journal of Marketing*, Vol. 71 No. 4, pp. 172-194.

Panayides, P.M. and Lun, Y.V. (2009), "The impact of trust on innovativeness and supply chain performance", *International Journal of Production Economics*, Vol. 122 No. 1, pp. 35-46.

Paulin, M., Perrien, J. and Ferguson, R. (1997), "Relational contract norms and the effectiveness of commercial banking relationships", *International Journal of Service Industry Management*, Vol. 8 No. 5, pp. 435-452.

Poppo, L. and Zhou, K.Z. (2014), "Managing contracts for fairness in buyer-supplier exchanges", *Strategic Management Journal*, Vol. 35 No. 10, pp. 1508-1527.

Poppo, L., Zhou, K.Z. and Li, J.J. (2016), "When can you trust 'trust'? Calculative trust, relational trust, and supplier performance", *Strategic Management Journal*, Vol. 37 No. 4, pp. 724-741.

Raynaud, E., Sauvee, L. and Valceschini, E. (2005), "Alignment between quality enforcement devices and governance structures in the agro-food vertical chains", *Journal of Management and Governance*, Vol. 9 No. 1, pp. 47-77.

Richey, R.G. Jr, Roath, A.S., Whipple, J.M. and Fawcett, S.E. (2010), "Exploring a governance theory of supply chain management: barriers and facilitators to integration", *Journal of Business Logistics*, Vol. 31 No. 1, pp. 237-256.

Ring, P.S. and Van De Ven, A.H. (1992), "Structuring cooperative relationships between organizations", *Strategic Management Journal*, Vol. 13 No. 7, pp. 483-498.

Rothaermel, F.T., Hitt, M.A. and Jobe, L.A. (2006), "Balancing vertical integration and strategic outsourcing: effects on product portfolio, product success, and firm performance", *Strategic Management Journal*, Vol. 27 No. 11, pp. 1033-1056.

Rungtusanatham, M., Salvador, F., Forza, C. and Choi, T.Y. (2003), "Supply-chain linkages and operational performance: a resource-based-view perspective", *International Journal of Operations & Production Management*, Vol. 23 No. 9, pp. 1084-1099.

Ruzzier, C.A. (2009), "Asset specificity and vertical integration: Williamson's hypothesis reconsidered".

Schulze, B., Spiller, A. and Theuvsen, L. (2007), "A broader view on vertical coordination: lessons from German pork production", *Journal on Chain and Network Science*, Vol. 7 No. 1, pp. 35-53.

Sezen, B. (2008), "Relative effects of design, integration, and information sharing on supply chain performance", *Supply Chain Management: An International Journal*, Vol. 13 No. 3, pp. 233-240.

Sezen, B. and Yilmaz, C. (2007), "Relative effects of dependence and trust on flexibility, information exchange, and solidarity in marketing channels", *Journal of Business & Industrial Marketing*, Vol. 22 No. 1, pp. 41-51.

Srinivasan, M., Mukherjee, D. and Gaur, A.S. (2011), "Buyer–supplier partnership quality and supply chain performance: moderating role of risks, and environmental uncertainty", *European Management Journal*, Vol. 29 No. 4, pp. 260-271.

Stouthuysen, K., Slabbinck, H. and Roodhooft, F. (2017), "Formal controls and alliance performance: the effects of alliance motivation and informal controls", *Management Accounting Research*.

Trienekens, J., Van Velzen, M., Lees, N., Saunders, C. and Pascucci, S. (2018), "Governance of market-oriented fresh food value chains: export chains from New Zealand", *International Food and Agribusiness Management Review*, Vol. 21 No. 2, pp. 249-268.

Trifković, N. (2016), "Vertical coordination and farm performance: evidence from the catfish sector in Vietnam", *Agricultural Economics*, Vol. 47 No. 5, pp. 547-557.

Vickery, S.K., Jayaram, J., Droge, C. and Calantone, R. (2003), "The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships", *Journal of Operations Management*, Vol. 21 No. 5, pp. 523-539.

Wacker, J.G., Wacker, J.G., Yang, C., Yang, C., Sheu, C. and Sheu, C. (2016), "A transaction cost economics model for estimating performance effectiveness of relational and contractual governance: theory and statistical results", *International Journal of Operations & Production Management*, Vol. 36 No. 11, pp. 1551-1575.

Wang, L., Yeung, J.H.Y. and Zhang, M. (2011), "The impact of trust and contract on innovation performance: The moderating role of environmental uncertainty", *International Journal of Production Economics*, Vol. 134 No. 1, pp. 114-122.

Ward, P.T., Leong, G.K. and Boyer, K.K. (1994), "Manufacturing proactiveness and performance*", *Decision Sciences*, Vol. 25 No. 3, pp. 337-358.

Wathne, K.H. and Heide, J.B. (2004), "Relationship governance in a supply chain network", *Journal of Marketing*, Vol. 68 No. 1, pp. 73-89.

Wathne, K.H., Heide, J.B., Mooi, E.A. and Kumar, A. (2018), "Relationship governance dynamics: the roles of partner selection efforts and mutual investments", *Journal of Marketing Research*, Vol. 55 No. 5, pp. 704-721.

Wernerfelt, B. (1984), "A resource-based view of the firm", *Strategic Management Journal*, Vol. 5 No. 2, pp. 171-180.

Wever, M., Wognum, N., Trienekens, J. and Omta, O. (2010), "Alignment between chain quality management and chain governance in EU pork supply chains: a Transaction-Cost-Economics perspective", *Meat Science*, Vol. 84 No. 2, pp. 228-237.

Wever, M., Wognum, P.M., Trienekens, J.H. and Omta, S.W.F. (2012), "Supply chain-wide consequences of transaction risks and their contractual solutions: towards an extended transaction cost economics framework", *Journal of Supply Chain Management*, Vol. 48 No. 1, pp. 73-91.

Williamson, O.E. (1975), *Markets and Hierarchies*, New York, NY, 2630.

Williamson, O.E. (1979), "Transaction-cost economics: the governance of contractual relations", *The Journal of Law and Economics*, Vol. 22 No. 2, pp. 233-261.

Williamson, O.E. (1985), *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, Collier Macmillan, New York, NY, and London.

Williamson, O.E. (1991), "Comparative economic organization: the analysis of discrete structural alternatives", *Administrative Science Quarterly*, pp. 269-296.

Williamson, O.E. (2000), "The new institutional economics: taking stock, looking ahead", *Journal of Economic Literature*, Vol. 38 No. 3, pp. 595-613.

Wynstra, F., Spring, M. and Schoenherr, T. (2015), "Service triads: a research agenda for the buyer–supplier-customer triads in business services", *Journal of Operations Management*, Vol. 35, pp. 1-20.

Xie, E., Liang, J. and Zhou, K.Z. (2016), "How to enhance supplier performance in China: an integrative view of partner selection and partner control", *Industrial Marketing Management*, Vol. 56, pp. 156-166.

Yang, H., Lin, Z. and Lin, Y. (2010), "A multilevel framework of firm boundaries: firm characteristics, dyadic differences, and network attributes", *Strategic Management Journal*, Vol. 31 No. 3, pp. 237-261.

Yang, Z., Su, C. and Fam, K.-S. (2012), "Dealing with institutional distances in international marketing channels: governance strategies that engender legitimacy and efficiency", *Journal of Marketing*, Vol. 76 No. 3, pp. 41-55.

Yang, Z., Zhou, C. and Jiang, L. (2011), "When do formal control and trust matter? A context-based analysis of the effects on marketing channel relationships in China", *Industrial Marketing Management*, Vol. 40 No. 1, pp. 86-96.

Yin, R.K. (2013), "Validity and generalization in future case study evaluations", *Evaluation*, Vol. 19 No. 3, pp. 321-332.

Yu, C.-M.J., Liao, T.-J. and Lin, Z.-D. (2006), "Formal governance mechanisms, relational governance mechanisms, and transaction-specific investments in supplier-manufacturer relationships", *Industrial Marketing Management*, Vol. 35 No. 2, pp. 128-139.

Zhang, X. and Aramyan, L.H. (2009), "A conceptual framework for supply chain governance: an application to agri-food chains in China", *China Agricultural Economic Review*, Vol. 1 No. 2, pp. 136-154.

Zhang, X. and Hu, D. (2011), "Farmer-buyer relationships in China: the effects of contracts, trust, and market environment", *China Agricultural Economic Review*, Vol. 3 No. 1, pp. 42-53.

Zhou, K.Z. and Xu, D. (2012), "How foreign firms curtail local supplier opportunism in China: detailed contracts, centralized control, and relational governance", *Journal of International Business Studies*, Vol. 43 No. 7, pp. 677-692.

Zhou, K.Z. and Poppo, L. (2010), "Exchange hazards, relational reliability, and contracts in China: the contingent role of legal enforceability", *Journal of International Business Studies*, Vol. 41 No. 5, pp. 861-881.

Zhou, Y., Zhang, X., Zhuang, G. and Zhou, N. (2015), "Relational norms and collaborative activities: roles in reducing opportunism in marketing channels", *Industrial Marketing Management*, Vol. 46, pp. 147-159.
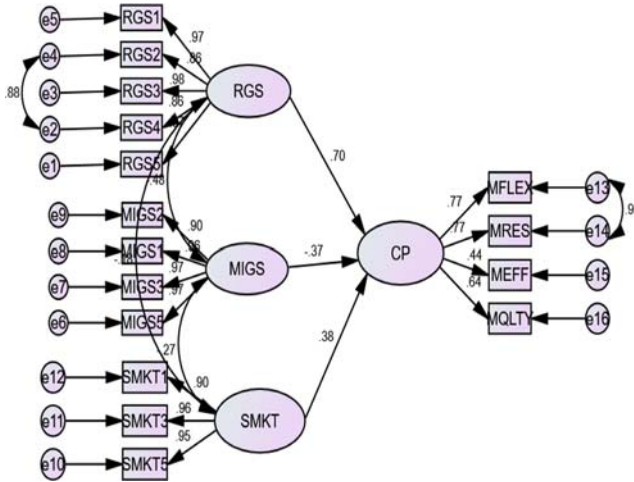
Appendix

Figure A1.
First suppliers' model

Notes: Model fit statistics are: χ^2/df=2.595, RMSEA=0.065,
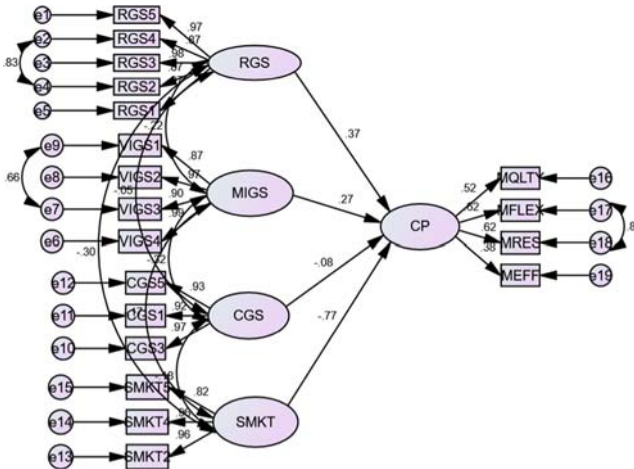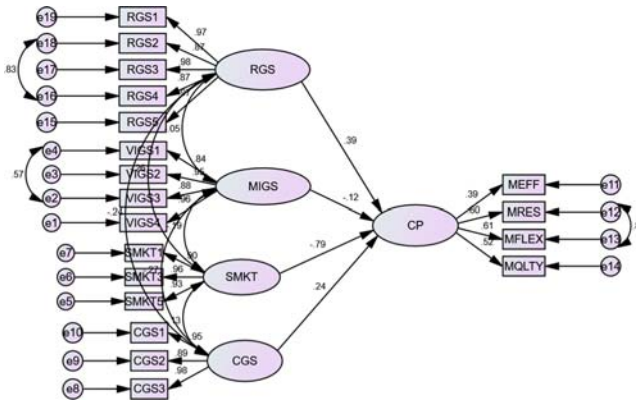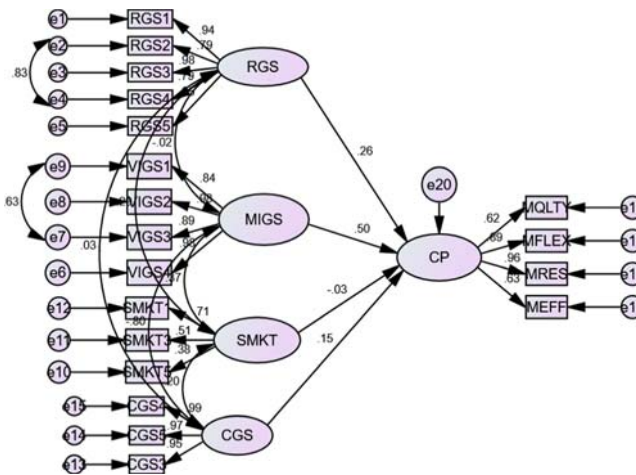GFI=0.891, AGFI=0.884, CFI=0.945, NFI=0.914, IFI=0.945

Figure A2.
Upstream buyers'
model

Notes: Model fit statistics are: χ^2/df=1.982, RMSEA=0.057,
GFI=0.900, AGFI=0.893, CFI=0.944, NFI=0.933, IFI=0.944

Notes: Model fit statistics are: χ^2/df=4.617, RMSEA=0.074,
GFI=0.901, AGFI=0.899, CFI=0.942, NFI=0.930, IFI=0.942

Figure A3.
Downstream
suppliers' model

Notes: Model fit statistics are: χ^2/df=1.710, RMSEA=0.069,
GFI=0.910, AGFI=0.900, CFI=0.960, NFI=0.916, IFI=0.960

Figure A4.
Buyers' model

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