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The influence of supplier development, in the form of contract farming, on performance in Zimbabwean tobacco industry

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Abstract: Supplier development in the farming industry takes the form of contract farming. Contract farming was introduced to tobacco farming in 2004. Prior to that contract farming has been thriving in other crops such as cotton and sugarcane. Previous studies on tobacco farming had an unbalanced focus on the social aspects of contract farming thereby largely neglecting the economic benefits of the same phenomenon. This study therefore seeks to determine how supplier development in the form of contract farming impact on supplier performances. A survey of 20 tobacco firms who had to rate 400 farmers was conducted, and the findings indicated that contract farming leads to improved cost performance and quality performance. However, the study recorded no statistically significant effects of contract farming on delivery performance. It was therefore recommended that contract farming structures must be strengthened in order to reap on the achieved benefits in terms of improved cost performance and quality performance.

Subjects: Agriculture & Environmental Sciences; Cultural Studies; Development Studies

Keywords: supplier development; contract farming; cost performance; quality performance; delivery performance

1. Introduction

The contract farming system used in the tobacco industry is a special form of supplier development initiatives. Supplier development is a strategic management approach that involves identifying and selecting suppliers worth improving in terms of performance for the benefit of a buying firm (Lysons & Farrington, 2016). Under contract farming, supplier development comes as a source of funding for most agricultural sectors world over especially in transitional economies (Swinen & Maetens, 2007) like Zimbabwe. More specifically, the production of cash crops such as tobacco and cotton is wholly funded through contract farming in countries such as Brazil, China, the United States of America (USA), Malawi, Mozambique, Turkey, and Zambia (Scoones, Mavedzenge, Murimbarimba & Sukume, 2018). The buying firm in contract farming may also provide extension

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The authors are lecturers in the Faculty of Commerce at Bindura University of Science Education. Their research interests are in agricultural supply chain management. This article is the first to address the impact of contract farming on Zimbabwe tobacco farmers.

PUBLIC INTEREST STATEMENT

This article sought to examine how contract farming (supplier development) benefits tobacco farmer unlike prior studies that concentrated of how supplier development benefits the buyer. It is the first such article to address the economic effects of contract farming to Zimbabwe tobacco farmers. The results of this study have policy implications that may improve the livelihoods of tobacco farmers in Zimbabwe.

advice, mechanization, seeds, fertilizers and other facilities to producers. The just ended economic policy dubbed the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIMASSET) identified contract farming as the main source of funding for most of agricultural activities.

Traditionally tobacco sourcing has been conducted through the auction system dating back to the colonial era until 2004 when contract farming was introduced into the tobacco industry. Henceforth, tobacco procurement followed a dual sourcing process. The auction system is characterised by a bidding process that pits tobacco merchants against each other in terms of quantity, pricing, quality, and delivery (Mazwi et al., 2018). Incidentally, the auction system is plagued with uncertainties along most of the buyer and supplier performance metrics. This is evidenced by imprecise production quantities, unstable purchase prices that serendipitously swing from low prices to outrageously high prices, fuzzy quality standards, and erratic delivery schedules (Ncube, 2020). As an alternative to the auction system in 2004 the contract system was introduced in Zimbabwe. In Zimbabwe agribusinesses usually engage farmers on contract basis for various reasons such as overcoming land constraints, being politically acceptable, reliable production than open market purchases, and attainment of consistent quality crops (Scoones et al., 2018). However, all along it has never been clear whether the introduction of the contract system into the tobacco supply chain has brought some improvements in the buyer and supplier performances of farmers in terms of key performance metrics such as cost performance, quality performance, and delivery performance.

While contract farming is exponentially becoming the sourcing method of choice in the tobacco industry no systematic efforts has been made to assess whether it leads to improved buyer and supplier performances. This leads to the main objective of this study which is to determine the effects of contract farming as a supplier development initiative on buyer and supplier performances. The rest of this study is organised in a manner that presents the related literature, which is followed by the methodology adopted. The analysis of collected data follows and thereafter the discussion of the presented results is conducted. The last sections outlines the conclusions reached and recommendations for future research agenda based on the limitations of the current study.

2. Literature review

2.1. Supplier development

Supplier development is a strategic management process of improving suppliers' operational performance and capabilities (Krause, Scannell & Calantone, 2000). Supplier development can also be regarded as a collaborative working with high potential suppliers in order to improve their capabilities and competencies (Humphreys et al., 2004 in critical areas such as cost, quality, and delivery performance. Leenders (1966) identified supplier development as an effective procurement tool that is domiciled in the upstream supply chain domain. Krause (1997) found supplier development to be a tool for increasing both performance and capabilities of suppliers in order to meet a firm's supply needs. Furthermore, supplier development serves to ensure adequate supplies of a commodity, regulate quality, and control the acquisition costs (Yegon et al., 2015). Supplier development also involves expanding the supply base where the existing supply base has a limited capacity (Popoolo, 2019).The supplier development process involves a buyer support in the form of capital investment, training of technical staff, and advice on effective operational procedures (Humphreys et al., 2004). It also involves conscious efforts to maintain a network of competent suppliers. In essence its meant to meet buyers' supply needs through investing in supplier capabilities within the dyads (Khan & Nicholson, 2014), or a wider supplier network (Govindan et al., 2010).

The supplier development concept has got a global appeal as evidenced by transnational studies in countries such as Germany (Wagner, 2011), Brazil (Laksham & Parrente, 2008), Japan (Sako, 2004), India (Govindan et al., 2010), and Hong Kong (Humphreys et al., 2004). Supplier development has also been studied in various contexts such as the electronic industry (Humphreys et al.,

2004), and the automobile industry (Shakri, Nabhani & Hodgson, 2009). In agribusiness supplier development initiatives usually take the form of contract farming. Studies in contract farming in general spans across a wide range of crops such as sugarcane tobacco (Mazwi et al., 2018), cotton and the poultry industry (Murthy & Madhuri, 2013).

Contract farming is a vertical coordination between agribusiness merchants and farmers of crops that need expensive inputs (Scoones, 2014). Contract farming is also a commercial decision to ensure supply of a commodity within a specified period of time, at an agreed price (Eaton & Shepherd, 2001). Contract farming is necessitated by the fact that agriculture is the main source of raw material for firms in agro-processing industry (Da Silva, 2005). Contract farming agreements usually contain a clause with specifications on contract duration, expected quality standards, production quotas, cultivation practices to be followed, delivery arrangements, and a price determination formula (Prowse, 2012). Recently contract farming has considerably expanded world over as a result of the vacuum in agricultural funding created by the disengagement of the governments from funding agricultural activities due to the dictates of the contemporary neo-liberal policies (Soones et al., 2018), and also its perceived improvements on supplier performances.

There are five models of contract farming in the extant literature: the centralised model, nucleus estate model, multipartite model, intermediary model, and the informal model (Bijman, 2008). These models vary depending on the product under consideration, type of resources availed, and the nature and intensity of the relationship between a firm and a farmer (Eaton & Shepherd, 2001). In Zimbabwe tobacco farming adopted the centralised model. The centralised model is a vertical form of contract farming (Abwino & Haikes, 2006) where a firm contracts a large number of farmers to supply a specified quantity of a commodity tagged with elaborated quality standards and a predetermined price. The centralised model is more suitable for crops that require a higher degree of processing before getting retailed (Bijman, 2008). In the centralised model, an agro-processing firm sponsors the farmers with varying degrees of inputs ranging from seedlings, fertilisers, agro-chemicals, land preparation and extension services (Eaton & Shepherd, 2001). In this manner a firm controls most production aspects of a contracted farmer. Specifically in the Zimbabwean tobacco industry contract farmers are given extensive extension services on good agronomic practices for taking care of tobacco crops right from the seedlings up to the harvesting period. Farmers are also equipped with farm management practices. Contracting companies may also supply seed and other production inputs to farmers. The farmers are given strict specifications to follow in terms of quantities and quality to produce. This model is popular with agreements involving high-value crops.

2.2. Performance metrics

The most common buyer and supplier performance metrics in the extant supply chain management literature are cost performance, quality performance, and delivery performance and there are reasonable grounds to suggest that these metrics can be impacted by supplier development initiatives such as contract farming. The former performance metric relates to buyer performance while the later performance metric relates to suppliers.

2.2.1. Cost performance

Cost is related to the price charged (Chopra et al., 2016). Price is the amount of money charged for a product (Kotler & Armstrong, 2013). While the amount of money charged for a commodity is regarded as price by the suppliers, the buying firms consider it to be the cost (Lysons & Farrington, 2016). Contemporary business analytics practice advocate for the assessment of all the costs involved in acquiring and using a product in what is referred to as Total Cost of Ownership (TCO) (Benton, 2014). TCO is defined as the sum of purchase price plus costs incurred prior to and post product delivery (Wisner et al., 2016). TCO focuses on the cost of a product throughout the entire product life cycle. TCO has become of paramount importance as a result of the limited scope presented by the attached price (Harrison & van Hoek, 2011). Price does not include the other costs that may be incurred in maintaining and using the product (Chopra et al., 2016). As a result of the

limited picture presented by price, it is imperative in sourcing decisions to pay attention to a more holistic approach of focusing on TCO (Ellram & Maltz, 1995). This is particularly important when comparing different sourcing strategies such as the contract system and the auction system.

There is general view that the cost performance of the contract system is more transparent than the one associated with the auction system. A study by the Competition and Tariffs Commission (CTC) (2015) revealed that in the contract system all the costs of inputs and levies paid are well documented than in an auction system which is associated with independent farmers. Another study by Shaba et al. (2017) which took the transparency dimension revealed that contract farming as a model of supplier development leads to improved cost performance as indicated by the access to price information, and reduction in price disagreements. This contrasted the auction system which is associated with chaotic price haggling and underhand dealing (Mazwi et al., 2018). However, a study by Murthy and Madhuri (2013) did not find statistically significant differences in terms of cost performance of the contract system and the independent farming system assessed through costs incurred in production. In a study by Yegon et al. (2015) where both financial and technical support were offered to suppliers, a marked improvement was observed in terms of cost performance. The acquisition cost of materials is also generally lower in the contract system than in the auction stem. For instance, an analysis by TIMB revealed that during the 2019/2020 tobacco agricultural season the average price/kg of tobacco was US$2.77 under the auction system while the contract system yielded US$2.4. This reveals that the cost of procuring tobacco was lower under the contract system than under the auction system.

The idea that cost performance is a function of the sourcing strategy adopted by a buying firm can be accounted for by the institutions theory's normative isomorphism dimension. Normative isomorphism refers to pressure emanating from societal expectations and professionalisation of an industry (Gopal & Gao, 2009). Professionalism involves social actors replicating each other's practice (Peng, Wong & Jiang, 2008). It is also associated with pressure emanating from cooperation and collaboration with the supply chain partners. This may involve defining the ethics, methods, and qualifications in order to establish legitimacy and homogeneity in an industry (DiMaggio & Powell, 1983). For instance, in Zimbabwe tobacco farmers and merchants are compelled to follow the guidelines and tenets of the Framework Convention on Tobacco Control (FCTC) since Zimbabwe has ratified those conventions. With regards to professionalism there are certain ways in which accountability in terms of expenses and costs incurred in the production should be reported. This is normally part of the accounting standards particularly the International Accounting Standards (IAS) such as IAS 1 (Presentation of financial statements, IAS 2 (inventories), and IAS 7 (Cash flow statements). It is therefore reasonable to anticipate that;

H1: *Supplier development initiatives in the form of contract farming lead to improved buyer cost performances*.

2.2.2. Quality performance

Quality is one of the most important metrics in supply chain management (Christopher & Towill, 2000). There are several definitions of quality emanating from different perspectives, but the most consistently used definition that has received a widespread acceptance and application, is that quality is the ability of a product to meet or exceed customer expectations (Juran et al., 2001). However, the major challenge with this definition is that customer (buyer) expectations vary a lot, bringing in the much dreaded element of subjectivity (Kotler & Armstrong, 2013). There is ample empirical evidence in support of the idea that contract farming is the antecedent to the attainment of quality produce. Self-financed crops tend to be of poorer quality due to the likely use of fewer inputs by poorly resourced farmers (Mazwi et al., 2018). The quality of self-financed crops by independent farmers has also been found to be compromised by the use of banned chemical substances (Mazwi et al., 2018). All merchants are compelled to set up a mechanism for tracing

the production and marketing system of the entire tobacco crop back to the farm for all the crops meant to be marketed internationally. The tracing system is more effective for crops grown under contract than those grown under self-financed schemes. It is possible to quarantine specific crops with quality problems before they mix with other crops in the contract system. This view is supported in a study by CTC (2015) which revealed that the quality of tobacco under the auction system was lower than that produced under the contract system. The reasons advanced for this disparity were that auction tobacco, being grown by independent farmers, lack traceability in terms of the nature and appropriateness of the inputs used.

There is vast empirical evidence that account for the differential effects of various financing systems on quality performance. Using the number of rejected bales as a surrogate indicator of quality, the number of rejected bales during the 2019/2020 tobacco agricultural season under the auction system in Zimbabwe was 13.35%, while, the contract system had only 2.89% rejection rate (TIMB, 2020). This is reinforced in a study by Shaba et al. (2017) in Malawi which noted lower reduction in number of rejected bales among farmers under the contract system than those under the auction system. Furthermore, a study by Murthy and Madhuri (2013) on the Indian poultry revealed that compared to independent farming the contract system is associated with less mortality rate and higher bird weight. Using gross margins returns to farmers as surrogate indicators of quality a study by Begun (2008) revealed that contract farmers realised 18.2 taka compared to 17.2 taka for independent farmers. Taka refers to the local currency in that nation. Furthermore, inferences from a study by Njenga et al. (2014) suggest that contract farmers tend to have their produce collected by the merchants thereby preserving the quality of the produce. In contract farming merchants usually collect the produce from the farm-gate thereby increasing the preservation of quality through timely collections and load consolidations. However, independent farmers that market through the auction system tend to have limited transport facilities thereby ending up having most of their produce' quality losing value. This is particularly the case with first mile delivery where most of the farm produce tend to lose value, through the use of head loading and non-motorised vehicles such as wheelbarrows and scot carts (Njenga et al., 2014).

Theoretically the differential effects of supplier development initiatives in the form of contract farming can be accounted for by the institutions theory's coercive dimension. Coercive isomorphism has pressure that has got some connotations of power differences. This type of pressure is usually codified (North, 1990) and it emanates from the regulations and the standards in an industry that impose regulatory constraints (Peng, 2008). For instance, the agricultural industry in Zimbabwe is highly politicised and regulated with almost every class of commodities having its own regulatory authority. Grain is regulated by the Grain Marketing board (GMB), cotton is regulated by Statutory instrument 142 of 2009 which limited ginners to sourcing cotton from their contracted farmers only, livestock is regulated by the Cold Storage Commission (CSC), while tobacco is regulated by the Tobacco Industry and Marketing Board (TIMB). These regulatory bodies provide pressure for various reasons such as the need to protect social welfare, promote fair competition, and ensure stability in an industry (Golicic et al., 2014).

Coercive pressure also emanate from stringent buyer requirements and regulatory requirements. In the Zimbabwean tobacco industry for instance, the regulatory framework is enshrined in the Tobacco Industry and Marketing Act [Chapter 18:20] that prescribes the operations of all the major participants in the industry. The tobacco industry in Zimbabwe is highly regulated with all the major participants ranging from the growers, graders, merchants, auction floors having to be registered in accordance with the provisions of the Act. As part of ensuring the capacity to provide quality crops, the current tobacco regulations have got stringent requirements that should be met by the growers such as a letter from the local AGRITEX officer conforming that the grower is a bona-fide farmer, and a proof of the availability of land. Moreover, the contract itself in contact farming is part of coercive isomorphism. The contract states the rights of buyers and the obligations of the suppliers. Usually such contracts contain clauses for punitive remedies to breach of contracts that can be in the form of liquidated or unliquidated damages. These regulations, if the

institutions theory is viewed as having explanatory power serves to explain how organisations behave as a result of trying to conform to the regulations. However, as a predictive theory it is difficult to rely on the Tobacco and Levy Act because this Act applies to both the auction system and the contract system leaving no room for differentiation. The predictive potential can nevertheless still be extracted from compliance with the regulations aspect. In the contract system the level of compliance is relatively higher than in the auction system due to the fact that monitoring and control by an independent party is almost non-existent in the auction system. Furthermore, the enforceability of the provisions specified in the contract system which are not found in the auction system makes it possible to suggest, based on the coercive isomorphism dimension of institutional theory, that supplier development initiatives (contact farming) lead to improved quality performance of the supplier. Based on the cohesive isomorphism dimension of the institutions theory it is therefore prudent to hypothesise that;

H2: *Supplier development in the form of contract farming leads to improved supplier quality performance*.

2.2.3. Delivery performance

Delivery performance has an impact on both cost and quality performance. Usually the attainment of quality is fully achieved when the required materials are delivered and made available for use in operations management. Thus, quality performance is fully embraced when the delivery performance is at its utmost best (Kotler & Keller, 2016). Delivery performance is a composite evaluation of all the aspects related to the movement of materials from the suppliers to the buyers such as accuracy, reliability, speed, timeliness, and precision (Forslund et al., 2008). In this study delivery performance is operationalised as timelines. Delivery timeliness refers to the precision with which material is moved from the supplier to the buyer (Lysons & Farrington, 2016).

The co-variation between supplier development initiatives and delivery performance received limited empirical studies. However, from the existing empirical studies inferences can be made that supplier development is closely associated with an improved delivery performance. A study in the Malawian tobacco industry by Shaba et al. (2017) has shown that the contract system as a model of supplier development leads to improved delivery performance as indicated by reduced days to bale tobacco, reduction in missing bales in transit, and less number of days in transporting tobacco bales from home to satellite depots. In a study by Krause et al. (2007) the notion that supplier development initiatives lead to improved delivery performance received some empirical support. Furthermore, a study by Wagner (2010) took an approach of dividing supplier development into direct and indirect involvement. It is through the former that Wagner (2010) found to have a significant contribution towards the improvement in delivery performance. However, a study Njenga et al. (2014) indicated that delivery performance of both contract and auction farmers are almost similar due to the structural factors that affect both of them.

There are reasonable grounds to suggest that supplier development leads to improved delivery performance. These suppositions are grounded in the institutional theory's mimetic isomorphism dimension. Mimetic isomorphism relates to pressure emanating from the best practices, and benchmarks borrowed from other successful players in the same industry (Liu et al., 2010;. Mimetic pressure is not codified, but simply indicates the shared values in a given community (North, 1990). This pressure is motivated by uncertainty associated with pursuing novel actions. In the face of uncertainty firms tend to copy the practices of other firms (Peng, 2002). These can be established standards in the industry. It is motivated by risk reduction efforts and conscious attempts to reduce experimentation and search costs. Mimetic pressure creates homogeneity in most industries. This kind of pressure has seen the contract system becoming the dominant sourcing strategy for tobacco merchants involved in value addition. Firms give in to mimetic pressure in order to avoid or hedge against uncertainty in a volatile environment (Zsdisin, 2003). Due to uncertainty in most business

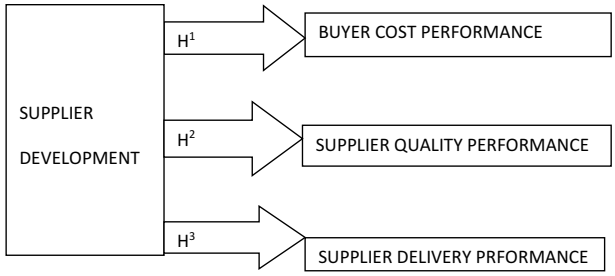


Figure 1. Proposed conceptual model.

operations, adopting the practices of the most successful competitors is the hallmark of mimetic isomorphism. It is taken as a well calculated measure to avoid plunging into the unknown. Imitating usually takes the dimension of mirroring firms that have structural similarity. This is particularly the case with how the contracting merchants have been operating in Zimbabwe. It is the standard practice among contract farmers to deliver their produce to the processing floors of the contracting firms within the shortest possible lead times, using efficient logistics infrastructure that ensures the delivery of the produce in good condition. Thus, almost all contract farming agreements in the tobacco industry look alike despite coming from different contracting parties. Drawing from the mimetic isomorphic dimension of the institution theory it reasonable to suggest that;

H3: *Supplier development initiatives lead to improved supplier delivery performance*.

The reviewed literature above logically leads to the formulation of the conceptual model in Figure 1.

The conceptual model above predicts that supplier development in general leads to the improvements in buyer and supplier performances, more specifically improvement in buyer cost performance and supplier quality and delivery performance respectively. The next section provides empirical tests of the above conceptual model whose results have both practical and theoretical importance as shall be elaborated in the last section of this study.

3. Methodology

This section presents an outline of the population, the sampling procedures implemented, and data collection process followed.

3.1. Population and sampling

A population is a universe to which sample results are applicable (De Vaus, 2002). In this study the population is made up of all tobacco farmers in Mashonaland Central province of Zimbabwe. A sampling frame obtained from the tobacco regulatory authority which is TIMB indicated that in Mashonaland Central province there are 39,710 registered tobacco growers of which 2 137 are independent farmers and 37,573 are contracted farmers (TIMB, 2020). The sample size in this study was determined using the statistical requirements of the adopted statistical techniques. Extant literature suggested that an evaluation of supplier performance must involve the perceptions of those involved in procurement processes (Giannakis, 2007). Therefore the perceptions of the 28 buyers' assessments of 400 farmers' performance was recorded. Thus the data collection instrument was administered to the buyers who had to rate their suppliers who in this case were both independent and contracted farmers.

This study used a probability sampling method of stratified random sampling. Stratified random sampling is a probability sampling technique in which a population is partitioned into stratums where a simple random sampling would be used to select the respondents from each stratum

(Bryman, 2016). Simple random sampling affords each unit of the population an equal chance of inclusion in the sample (Saunders et al., 2016). The justification for the use of a stratified random sampling in general and indeed to this study in particular is that there is an assured representativeness in the sample (Saunders et al., 2016), there is a possibility of making comparisons between the strata (Bryman & Bell, 2015; Burns & Burns, 2008), and there is a greater precision in making estimates for the target population (Hair et al., 2014).

One of the conditions of stratified random sampling is that each stratum must be mutually exclusive and collectively exhaustive (Maholtra, 2006). Furthermore, the stratified random sampling requires one of the study variables to be used as the basis for stratification (Burns & Burns, 2008). The stratification variable should be categorical in nature, and should be chosen on the basis that it increases internal homogeneity in each stratum, and heterogeneity across the strata, and can be obtained from secondary data (Zikmund & Babin, 2007). In this study supplier development initiative was used as the stratification variable and each mode of agricultural financing was designated as a stratum leading to a strata made up of the contract system and the independent system. Having identified the viable strata, the sample size was derived from the strata using the proportionately stratified sampling strategy. The proportionately stratified sampling is designed in such a way that the sample size for each stratum is dependent on its relative size (Hair et al., 2014).

3.2. Data collection instrument

In order to produce results that are comparable to previous studies measures for this study were selected from the extant literature. Jones and Suh (2000) advised that its "*unnecessary to develop new scales given the number of acceptable scales that exist in literature*", since the use of validated measurement scales transforms a field from an art into a science (Bruner, 2003). Moreover, clandestine uses of multiple measures for the same constructs create unnecessary variances in the parameter estimates in extant literature (Slavec & Drnovseck 2012). Therefore, the sections below present the sources of valid and reliable measures that were adopted from previous studies.

The data collection instrument comprised of supplier development as a binary categorical variable, and validated measurement scales related to the three dependent latent variables in this study: quality, cost, and delivery performance. The items for the constructs were distilled from the extant supply chain management literature. The items used and their related coding are shown in Table 1. The latent variables were measured using a 7-point Likert scale anchored between (1) strongly disagree, and (7) strongly agree assessing the perceptions of the respondents with regards to their suppliers' performance. Cost performance was measured using 5 item summated measurement scale, and quality performance was measured using a 9 item summated scale both of whose items were distilled from the works of Wisner et al. (2016), while delivery performance was measured using a 5 item summated scale whose items were adopted from Chopra et al. (2016).

3.3. Data collection procedures

A structured data collection instrument was self-administered by all the respondents in the sampling frame who were the heads of their respective PMUs. The respondents were asked to conduct an overall evaluation of the performance of their suppliers. The suppliers in this case were either contract farmers or independent farmers. In order to capture the correct evaluations buyers rated those farmers whom they had interfaced with during the 3 months period prior to data collection. While collecting data some tenets of research ethics were observed and followed. These included having to seek the informed consent from the respondents, maintaining the respondents' right to privacy and confidentiality (Saunders et al., 2016).

A survey method of data collection using a self-administered questionnaire was used in this study. Surveys are ways of gathering primary data using a structured questionnaire with direct questions related to the respondents' opinions, perceptions, preferences, knowledge, motivations, intentions,

Table 1. Measurement scale items

Construct	Item code	Item description
Cost performance	C1	Improved cost through cooperation
	C2	Warranty
	C3	Competitive price
	C4	Willingness to negotiate
	C5	Cost break downs
Quality performance	Q1	Continuous process improvement
	Q2	Corrective action program
	Q3	Fit for use
	Q4	Zero defects
	Q5	Improved quality through cooperation
	Q6	Statistical process controls
	Q7	Documented quality program
	Q8	High pick accuracy
	Q9	High inventory accuracy
Delivery performance	D1	Defect free deliveries
	D2	Reliable
	D3	Improved delivery through cooperation
	D4	Fast
	D5	High order accuracy

and awareness through communicating with the identified and chosen respondents (Wegner, 2013). Self-administered questionnaires were used in this study on the basis that all the respondents were presumed to be highly literate, since self-administered surveys rely on the clarity of the items in a data collection instrument. It is a common cause that most of the professional buyers like the ones found in the Zimbabwean tobacco industry hold some kind of a formal tertiary qualification which makes them reasonably understand almost all the issues raised in the data collection instrument without referring to the researcher. Moreover, self-administered questionnaires are associated with high unit response rates (Aguinis, Hill & Bailey, 2019), although they are generally characterised with some item non-responses (Bryman, 2016). Furthermore, turnaround period for filling in self-administered questionnaires is generally short making this method particularly suitable for studies in the academia that have relatively limited durations and resources (Hair et al., 2014). Self-administered questionnaires also eliminate interviewer biases through enhancing respondent control (Hair et al., 2014), while at the same time ensuring respondent anonymity (Wegner, 2013). The self-administered survey was affected using the drop-and-pick strategy. This method involves handing the questionnaires to the selected respondents and allows them some time to fill-in (Maholtra, 2006). After the lapse of an agreed period the researchers had to come and collect the completed questionnaires from the respondents (Hair et al., 2014).

4. Results

This section presents the results from the analysis of data and the discussion of the results. Data analysis was done in three sections which are namely the response rate and demographic profile of the respondents section, measurement scale validation, and hypothesis testing.

4.1. Response rate and demographic profile of the respondents

There are two types of response rate: unit response rate and item response rate. The former relates to data obtained from a unit in the selected sample, and the later refers to the completeness in responding to all the items in a data collection instrument. Both the unit response rate and the item response rate were 100%. The demographic profile of the respondents is presented in two categories which are namely the buyers, and the suppliers (farmers). The informants in this study were the buyers who supplied information about their evaluations of the contracted farmers and independent farmers and the results are presented in Table 2.

The buyers were the direct respondents and their profile was limited to gender, position in the department, and tenure of service. Males were 70% of the respondents, while females constituted 30%. Most of the respondents were clerks (63%), followed by Managers (30%), while directors were 7% only. Ordinarily the ideal respondents are the senior managers and the directors. However, in the agro-processing industry in Zimbabwe firms tend to improve their profit margins by suppressing the labour costs. As a result it is not surprising to find that most managerial level employees assume the title of senor clerks as a result of avoiding litigations. Therefore some senior clerks in the agro-processing industry play several strategic roles such as developing and executing strategic plans within their assigned sections. They also implement company policies. Most of the respondents had a short tenure of service (70%), followed by a medium tenure (25%), while only a few had a long service in the industry (5%). This may be indicative of high labour turnover that characterise the agro-processing industry.

The farmers were indirect subjects, but whose performance formed the core of this study. The profile of tobacco farmers indicated that females were 45%, while males were 55%. This is indicative of the patriarchal society that characterise most of the African societies (Chambati , 2017). The land holding for tobacco farmers was dominated by small-scale landholders (60%), followed by medium commercial farmers (30%), and then large commercial farmers (10%). This is in line with the agricultural structure post FTLRP. Lastly, the majority of the respondents were contract farmers (75%), while the remainder was occupied by independent farmers (25%). This closely mirrors the status quo in terms of tobacco farming modes of financing.

4.2. Validation tests

The measurement scale validation stage tested latent variables' dimensionality, construct validity, and reliability (Netemeyer, Bearden & Sharma, 2003).

4.2.1. Dimensionality tests

Dimensionality was assessed to determine whether a pool of related items exhibit a unidimensionality pattern. Unidimensionality is described as a set of items underlined by a single construct (Germain et al., 1994). Dimensionality was evaluated using Principal Component Analysis (PCA) (Tabachnick, & Fidell, 2012). The popularity of PCA lies on the fact that it is a default factor extraction method in most data analysis softwares (Costello & Osborne, 2005). However, the test of unidimensionality is applicable to data that is factorable. The factorability of the data set was assessed using the Kaiser-Meyer-Olkin (KMO)'s measure of sampling adequacy, and the Bartlett's test of sphericity (Sarmento & Costa, 2017). PCA revealed the KMO of 0.841 for cost performance which falls in the meritorious region, 0.9 for quality performance which is the marvellous category, and 0.818 for delivery performance which is the meritorious category. The Berlet's test of sphericity had a p value of 0.000 for all the constructs. The attained values for both the KMO and the Bartlet's test indicated that the data for all the study constructs was appropriate for factor analysis.

PCA extracted a single component for cost performance which explained 61% of the variance and had an eignvalue of 3.060 which suggested that cost performance was a unidemensional construct. On Quality performance PCA extracted 2 components of which the first component explained 42.2% of variance, while the second component explained 20.16% of the variance and both had eigenvalues above 1. Thus quality performance presented some dimensionality problems. Since the pattern of the

Table 2. Demographics

Buyers			
Attribute		***N***	**%**
Gender	Male	21	70
	Female	9	30
Position in the buying department	Director	2	7
	Manager	9	30
	Senior Clerk	19	63
Tenure of service	0–4 years	20	70
	5–9 years	8	25
	10yars and above	2	5
Total		**30**	**100**

Farmers			
Attribute		*N*	%
Gender	Male	220	55
	Female	180	45
Type of land holding	Small scale landholder	240	60
	Medium commercial farmers	120	30
	Large scale commercial farmers	40	10
Mode of financing	Contract farmer	300	75
	Independent farmer	100	25
Total		**400**	**100**

component structure generated could not be meaningfully interpreted, only the first component was retained with items loading on the second component (QP1, QP2) of the same construct deleted. Item Q7 was also excluded from further analysis since it could not load significantly in any of the components generated. Lastly, PCA extracted a single component for delivery performance which explained 64.19% of the total variance. However item DP2 did not load significantly and was therefore excluded from further analysis. Delivery performance did not present any dimensionality problems; hence the results presented in Table 3 show some evidence of its unidemensionality.

4.2.2. Factor structure

Unidimensionality tests were immediately followed by an exploratory factor analysis whose sole purpose was to establish the factor structure of the collected data. EFA was conducted using Principal Axis Factoring (PAF) as the extraction method.

EFA established a 3-factor structure comprising of cost performance, quality performance, and delivery performance as indicated in Table 4. Most of the items loaded in their respective constructs thereby providing the initial evidence of convergent validity. However, CP1 did not load significantly in any of the factors and was therefore excluded from any further analysis. There were no cross loading items and this provided preliminary evidence for discriminant validity. After conducting an EFA the items were further subjected to a CFA in order to assess the validity of the established hypothesised factor structure. A CFA analysis revealed the results in Figure 2.

The measurement model indicated that all the items in the data set loaded significantly to their respective factors. The validity of the three-factor model was further evaluated using fit indices. Model fit relates to the extent to which implied covariance matrix closely resembles the empirical covariance matrix (Hair et al., 2014). An insignificant chi-square signifies model fit while, the values for NFI, CFI, and PNFI range from 0 to 1 with values closer to 1 indicating a good fit (Byrne, 2010).

Table 3. Unidemensionality tests

		Cost	Quality		Delivery
		1	1	2	1
CP4		.957			
CP5		.758			
CP1		.660			
CP2		.659			
CP3		.544			
QP4			.757		
QP9			.665		
QP5			.663		
QP3			.659		
QP8			.593		
QP6			.578		
QP7					
QP1				.856	
QP2				.854	
DP3					.974
DP5					.795
DP1					.761
DP4					.758
DP2					
Variance explained in percentage			42.023	20.155	
Eigenvalue			3.782	1.814	
Cronbach's alpha coefficient			.837		
KMO measure of sampling adequacy			.9		
Bartlette's test of sphericity	Approx. Chi-Square		1847.565		
	df		36		
	Sig.		.000		

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

All the fit indices shown in Figure 1 indicated the fitness of the 3-factor measurement model except for the X^2 value which was highly significant. A significant X^2 value suggests that there are considerable differences between the predicted model and the actual model leading to the possible rejection of the hypothesised model. However, since X^2 is sensitive to larger sample sizes (Hair et al., 2014), an alternative suggested by Jereskog & Sorbom (1989) which involves examining the ratio of X^2value to the degrees of freedom was assessed. The X^2/df attained was 4 which was within the rule of thumb suggested by Kline (2010) as 5.

A more robust test of convergent validity which is Average Variance Extracted (AVE) (Fornell & Larcker, 1981) was also used. The results for this test are shown in Table 5.

The AVE for each latent variable was above 0.5 which suggested that there is adequate convergent validity for each of the variables. This means that the items for each construct share a high proportion of common variance (Hair et al., 2014). Discriminant validity was also accessed using AVE following the Fornell and Larcker (1981) procedures. The procedures involved comparing each variable's AVE to

Table 4. Factor structure

	Factor		
	1	2	3
QP9	.910		
QP6	.863		
QP8	.863		
QP5	.844		
QP3	.835		
QP4	.829		
DP3		.984	
DP5		.816	
DP1		.757	
DP4		.727	
CP4			.909
CP2			.734
CP5			.720
CP1			

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 4 iterations.

its shared variance with other variables. The AVE for each variable was by far greater than its shared variance with other variables suggesting that there were adequate discriminant validity.

Reliability of the latent variables was assessed using the Composite Reliability (CR) coefficient. The CR coefficients of the latent variables were all above the threshold of 0.7 suggested by Nunally and Bernstein (1994) as the minimum for a variable to be considered as valid. Having demonstrated that the latent variables in this study have the pre-requisite psychometric properties acceptable in measurement scale validation such as unidimnsionality, construct validity, and reliability, the study proceeded to the next stage which was hypothesis testing.

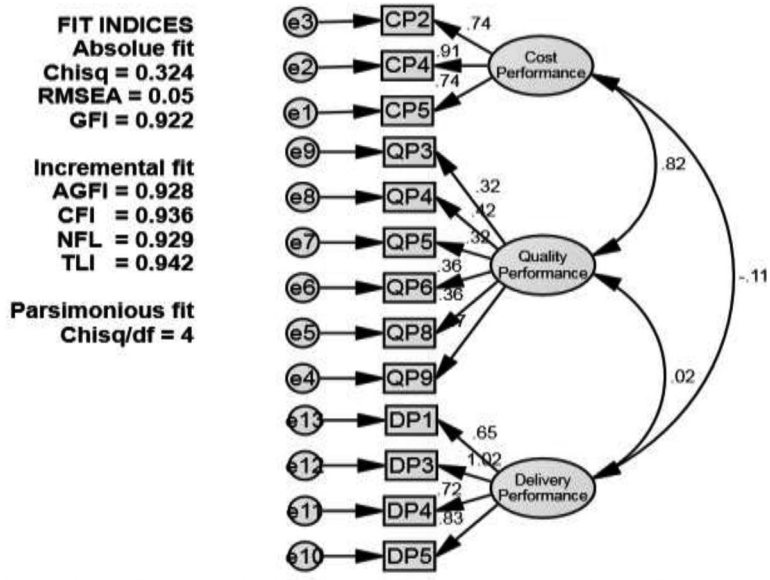
4.3. Hypothesis testing

The third stage involved hypotheses testing using structural equation modelling. The first hypothesis (H1) suggested that supplier development initiatives lead to better cost performance. The second (H2) hypothesis postulated that suppler development initiatives lead to improved quality performance, while the third (H3) hypothesis indicated that supplier development initiatives lead to responsive delivery performance. The results from hypotheses testing are shown in Table 7 and Figure 2 with supporting explanations drawn from descriptive statistics in Table 6.

Table 6 presents the descriptive statistics in the form of the arithmetic mean and the standard deviation for all the dependent variables under study. The interpretation of these descriptive statistics is synthesised with the independent samples *t* tests and path analysis in Table 7.

H1 predicted that supplier development in the form of contract farming leads to improved cost performance. An independent samples *t*test revealed that contract farmers (M = 3.762; SD = 0.77366) were rated higher than independent farmers (M = 2.848; SD = 0.94072) in terms of cost performance ($t(398) = -9.672$, p = 0.00). The path analysis in Figure 3 found that relationship to be statistically significant (B = 0.44, CR = 9.684, P = 0.000).

Figure 2. Measurement model.



Unstandardised Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
CP5 <--- Cost_Performance	1.000				
CP4 <--- Cost_Performance	1.179	.027	43.389	***	
CP2 <--- Cost_Performance	.904	.041	22.165	***	
QP9 <--- Quality_Performance	1.000				
QP8 <--- Quality_Performance	.695	.091	7.636	***	
QP6 <--- Quality_Performance	.684	.090	7.613	***	
QP5 <--- Quality_Performance	.633	.095	6.654	***	
QP4 <--- Quality_Performance	.877	.094	9.354	***	
QP3 <--- Quality_Performance	.667	.100	6.650	***	
DP5 <--- Delivery_Performance	1.000				
DP4 <--- Delivery_Performance	1.244	.071	17.607	***	
DP3 <--- Delivery_Performance	1.287	.048	26.783	***	
DP1 <--- Delivery_Performance	.746	.049	15.319	***	

Table 5. Average variance extracted, shared variance and composite reliability

Construct	AVE	Composite Reliability	Standard Error	Shared Variance		
				Cost Performance	Quality Performance	Delivery Performance
Cost Performance	0.577	0.754	0.246	1		
Quality performance	0.883	0.919	0.081	0.672	1	
Delivery performance	0.547	0.807	0.13	0.012	0.004	1

H2 specified that supplier development in the form of contract farming leads to improved quality performance. The results in Table 6 showed that contract farmers were rated higher (M = 3.650; SD = 0.73778) than independent farmers (M = 3.340; SD = 0.86129) in terms of their quality

Table 6. Descriptive statistics

	Mode of farming	*N*	Mean	Std. Deviation	Std. Error Mean
Cost_ performance	Auction system	100	2.848	.94072	.09407
	Contract system	300	3.762	.77366	.04467
Quality_ Performance	Auction system	100	3.340	.86129	.08613
	Contract system	300	3.650	.73778	.04260
Delivery_ performance	Auction system	100	3.892	.76932	.07693
	Contract system	300	3.874	.79347	.04581

performance. An independent samples *t* test found this pattern to be significant ($t(398) = -3.485$; $p = 0.001$). Furthermore, the significance of the relationship between supplier development and quality performance was supported by path analysis in Figure 2 where B = 0.172, CR = 3.489, P = 0.000.

H3 suggested that supplier development in the form of contract farming leads to improved delivery performance. This hypothesis was not supported. Since the homoscedasticty assumption was not met on delivery performance (Table 7), a Cochrain& Cox (1957) adjustment to the standard error, and the Satterhwaite (1946) adjustment to the degrees of freedom was used. These adjustments are shown in the bottom raw for each variable in Table 7 labelled "Equal variances not assumed". An independent samples *t*test revealed that contract farmers (M = 3.974; SD = 0.79347) were rate similarly to independent farmers (M = 3.892; SD = 76,932) in terms of delivery performance since there were no statistically significant differences ($t(174) = 0.191$; $p = 0.847$). Further analysis (Figure 3) indicated that the beta weight for the relationship between supplier development and delivery performance was statistically insignificant (B = −0.10, CR = −0.191, P = 0.849).

5. Discussion

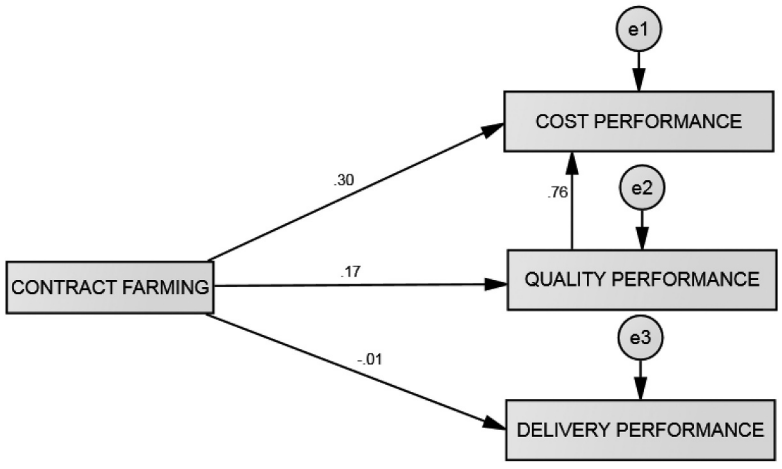
It has been revealed in this study that there is better cost performance in a contact system than in an auction system. It seems there is a lot of transparency in the contract system where cost break-downs are shared among the contract partners. Perhaps this could be one of the drivers for contract farming gradually becoming the tobacco sourcing and marketing platform of choice for both farmers and merchants (Scoones, 2014). This apparently means that there is proper spend analysis that could be done through the contract system since buyers can easily have accurate cost break-downs of their sourcing expenditure. This is unlike in the auction system where the costs incurred in sourcing material cannot be ascertained prior to the beginning of the marketing season. Most of the prices in the auction system are also volatile since they are dependent on several market dynamics. More so, the prices themselves are an outcome of pitting merchants against each other thereby further clouding the cost performance (Mazwi et al., 2018).

This study also demonstrated that there is a significant improvement in quality performance of tobacco farmers as a result of contract farming. There are numerous factors that account for this improvement that range from the provision of quality and adequate inputs to the availability of extension services. Although both contract farmers and independent farmers receive extension services from agricultural extension officers in their jurisdictions, contract farmers have the privy of mandatory supplementary extension services from tobacco merchants who had contracted them. Thus, monitoring is intensive under the contract system that spans through the cultivation up to the harvesting period. Moreover, quality control is often difficult when a merchant is dealing with

Table 7. Independent samples t tests 1

		t-test for Equality of Means						
		T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Cost_performance	Equal variances assumed	9.672	398	.000	.91400	.09450	1.09978	.72822
	Equal variances not assumed	8.777	146.212	.000	.91400	.10414	1.11981	.70819
Quality_performance	Equal variances assumed	3.485	398	.001	.31000	.08895	.48488	.13512
	Equal variances not assumed	3.226	150.372	.002	.31000	.09609	.49985	.12015
Delivery_performance	Equal variances assumed	.191	398	.849	.01733	.09094	.16144	.19611
	Equal variances not assumed	.194	174.395	.847	.01733	.08954	.15939	.19405

Figure 3. Structural model.



Regression Weights: (Group number 1 - Default model)
M.I. Par Change
QUALITY_PERFORMANCE <--- COST_PERFORMANCE 226.450 .638
COST_PERFORMANCE <--- QUALITY_PERFORMANCE 271.392 .863

Regression Weights: (Group number 1 - Default model)
Estimate S.E. C.R. P Label
QUALITY_PERFORMANCE <--- CONTRACT_FARMING .310 .089 3.489 *
COST_PERFORMANCE <--- CONTRACT_FARMING .638 .052 12.182 ***
DELIBERY_PERFORMANCE <--- CONTRACT_FARMING -.017 .091 -.191 .849
COST_PERFORMANCE <--- QUALITY_PERFORMANCE .889 .029 30.580 ***

Fit Indices

CIMIN	DF	P	CMIN/DF	NFI	IFI	TLI	CFI	AGFI	RMSEA
8.787	2	0.05	4.393	.982	.985	.955	.985	.934	.05

a large pool of farmers whom he does not have intimate knowledge of due to the issue of lack of traceability. Traceability is only possible in advanced nations such as the USA and China where they have pesticide residue testing centres. However, when dealing with few contracted farmers it is easy to trace quality issues back to a specific farmer should quality concerns arise even in poorly resourced nations like Zimbabwe.

In this study, it was further revealed that there is no improvement in terms of delivery performance as a result of contract farming. The lack of significant improvement in delivery performance can be accounted for by the structure of operations in the auction system which is the bases for assessing the improvement brought by contract farming. The auction system of tobacco has stringent delivery requirements. The system allows the receipt of booked deliveries only. The booking for delivery involves a specified date and quantity to be delivered. Excess and late deliveries are not permitted and may attract severe penalties (TIMB, 2020). Moreover, there seems to be similar access to the same mode of transport for delivery by both contract farmers and independent farmers. Where independent farmers lack appropriate modes of transport, 3PL operators have a standing arrangement to provide logistics services on credit and then recover their money from the auction floor proceeds.

Delivery performance in contract farming was found not to have significantly improved from the levels of the auction system. It is therefore recommended that in the long run tobacco merchants must invest in road infrastructure such as paved roads and loading bays. In the short run they must invest in roadside load consolidation points.

The findings in this study revealed a significant relationship between supplier development in the form of contract farming and important supplier performance metrics and this provides some empirical basis for pursuing the contract system as the prime sourcing strategy in the tobacco processing industry. This is particularly important considering that the effectiveness of contract farming leverages on strong relationships with suppliers. This is even more pronounced by the fact that in the contemporary environment suppliers are no longer competing for buyers (Vos et al., 2016), but it is the buyers who are now competing for suppliers (Vos et al., 2016) in a phenomenon called reverse marketing (Leenders & Blenkhorn, 1988). The trend of reverse marketing is being influenced by the growing scarcity of suitable suppliers . This trend is complimented by the preferred customer status concept where buyers seek to present a favourable image to suppliers (Schiele et al., 2012). This makes tobacco merchants to move away from the myopic approach of prioritising short term contracts to transactions regarding price and quality issues (Fossas-Ollala et al., 2013). However, relationships in contract farming lead to contractual bonds that create discriminations against suppliers (Villena et al., 2011). Furthermore, contract farming as an industry specific model of supplier development may create structural bonds that may be difficult to extricate from in the event of one part behaving in a rent-seeking manner (Anderson & Jap, 2005).

This study has revealed that contract farming leads to improved supplier performance in several aspects. It is therefore recommended that tobacco merchants must pursue contact farming as the arch sourcing strategy. However, tobacco merchants must pay attention to the fact that contract farming is associated with innumerable challenges affecting both the merchants and farmers. Such challenges include, but not limited to higher input and output prices, failure to meet production targets, loan repayment failure, side marketing, shifting of land use patterns towards cash crops at the expense of food crops thereby reducing food self-sufficiency, and the use of English language and legal jargons in drafting contracts which regrettably cannot be understood by most peasant farmers.

Considering that contract farming as an industry specific form of supplier development initiatives leads to improved supplier performance, there is need to consolidate the gains that accrued since 2004 when contract farming was introduced to the tobacco farming industry in Zimbabwe. This involves eliminating externalities associated with contract farming such as unequal power relations between merchants and farmers. For the sake of continuity of the contract system as a model of supplier development initiatives a win-win situation must be strengthened between merchants and contract farmers. Hitherto there has been an asymmetric relationship that is tilted in favour of the merchants. Contract farmers have raised numerous complaints against merchants which have the threat of negatively impacting on the future performance of contract farming arrangements. Some of the negative observations include, but not limited to price collusions, bribery, and favouritism.

Considering that in this study contract farming as an industry specific model of supplier development has been found in this study to lead to an improvement in various supplier performance metrics, it is logical for tobacco merchants to embark on supplier rationalisation leveraging on the findings in this study. Supplier base rationalisation is the determination of the optimum supplier base size, and then identifying the suppliers who can be part of the base. This often results in an increase or decrease in the supplier base size (Sarkar & Mahopatra, 2006). In Mashonaland central there are currently 31,000 tobacco farmers. The number can be reduced on the basis of supplier development initiatives. The merits associated with supplier base reduction include, but not limited to few sources to contact in the event of short notices , increased economies of scale (Lyson & Farrington, 2016), reduced inventory management (Chopra et al., 2016), improved buyer–supplier relationship , improved communication due to trust , supplier responsiveness , and improved financial performance (Cai et al., 2010).

Lastly, tobacco is a strategic item in the tobacco processing industry. Strategic items are defined as materials that have both high profitability impact and supply risk (Kraljic, 1983). Very often strategic

items are amenable to single sourcing strategy thereby increasing supply risk. Supply risk is the probability of suppliers failing to meet the buyers' orders (Zsidin, 2003). It is therefore recommended that while the contract system with all its virtues remains as the main sourcing strategy for tobacco crops, the auction system must not be obliterated. The auction system must always be kept at bay in order to cover for the potential short-term setbacks in the contract system.

6. Conclusions, limitations, and future recommendations

In conclusion, strong emphasis must be made on the fact that this study exclusively focused on the economic side of contract farming from the buyers' perspectives. It avoided the social aspects of contract farming which have extensively been dwelt on in the extant literature. Previous research has already revealed that contract farming is closely associated with improved household food security, accelerated skills transfer, and exponential growth in household asset accumulation (Khan et al., 2019). Therefore, this study provided an additional contribution to very important, but largely neglected dimensions of contract farming which are buyer and supplier performances.

One of the limitations of this study is that the majority of the respondents are at the clerical level. Ideally the majority of the respondents should have been at the level of directors or managers. Ordinarily, clerks in the buying department may not be privy to confidential administrative data. However, in this study the surveyed clerks had broadened responsibilities that made them privy to the necessary information sought for this study. This was as a result of the directors or managers for those respective firms being domiciled abroad. However, future researches in the same domain must strive to contact directors or general managers of agro-processing firms involved in contract framing through emails or snail mail.

This study focused on three major supplier performance metrics: cost performance, quality performance, and delivery performance. Although these performance metrics have got a widespread use in strategic sourcing, they only represent a small portion of all the useful performance metrics in the extant literature. Therefore readers, both academics and practitioners, are cautioned from entirely relying on these three metrics alone, since it is an altruism that a holistic picture can only be provided by having a concoction of wide and varied metrics. Moreover, the use of a questionnaire for data collection may be unnatural leading to the introduction of limited ecological validity. Ecological validity refers to the applicability of the findings to a natural setting (Bryman & Bell, 2015). Therefore, future studies must strive to make use of other data collection methods like secondary data and observations were possible.

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