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Collaboration in Agri-Value Chains: Building Supplier Production Capabilities for Productivity Gains

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<http://dx.doi.org/10.5772/intechopen.70132>

Abstract

This research employed an explanatory case study to compare supplier production capabilities for enhancing productivity gains between Uganda commercial forestry and sugarcane sector value chains. Key study results indicated that only 18% of the sugarcane farmers achieved the desired industry productivity output of at least 100 t/ha from their fields, with majority (82%) of the cane growers producing below expected industry productivity output. In the forestry sector, 41.3% of the farmers achieved the desired industry performance targets, with 58.7% of the growers performing below expected performance targets. The major buyers' supplier development behaviour as seen in the diffusion of knowledge, skills and appropriate technology along vertical and horizontal collaborative value chain relationships, explains this paradox. Millers in the sugarcane sector used contractors to diffuse knowledge and skills, which weakened the supplier production capabilities. In the forestry sector, with the support of development partner agencies, productivity was higher due to effective diffusion of knowledge, skills and appropriate technology to primary producers. This finding strongly points to the need to implement deliberate supplier development strategies by the development partner agencies and governments, if productivity gains are to be improved within the agri-business value chains in developing countries.

Keywords: global value chains, productivity, supplier production capabilities, investment asset specificity, transactional costs and opportunistic behaviors

1. Introduction

The globalization of economic activities requires an understanding of the dispersed value creation activities that capture processes across space and time, which in turn precipitate interest

in global value chains (GVCs). Participation in global value chain is therefore seen as imperative for firm survival and sustainability. This has placed GVC participation on a high-level policy agenda by development partners as a prescription template for agribusiness productivity growth and competitiveness of developing countries, especially sub-Saharan Africa. Development organizations are investing in organization competencies to participate in GVC.¹ The World Trade Organization articulates the importance of GVC participations as follows:

“Any discussion today of international trade and investment policy that fails to acknowledge the centrality of global value chains (GVCs) would be considered outmoded and of questionable relevance” [1].

Despite the interest in GVC participation, intense debate still lingers over root causes of why some countries are advancing in the global marketplace, while others are failing to do so [2]. Supply chain production capabilities to drive productivity gains for growth have been highlighted by the value chain (VC) fraternity researchers as an area of interest to investigate this phenomenon. In Adam Smith’s classical work, entitled *The Wealth of Nations* [3], Adam contended that productivity gains are vital to the economy, and it is the true measure of a nation’s growth, as more (higher output) is being accomplished with less (minimum inputs). Capital and labor are both scarce resources, so maximizing their impact is a core concern of modern business. Productivity gains have been identified to emanate from technological advancements such as information and communication technologies, supply chain and logistics improvements, and improved skill levels within the workforce.

This study investigated the presence of productivity gains among primary producers, that is, the supply workforce (farmers or primary commodity producers) capabilities in Uganda’s agribusiness value chains. The level of available supply production capabilities determines the choice of the governance structure to coordinate interfirm relationships, which can be done either through spot markets (arm’s length transactions and/or cash transactions with immediate delivery) or hierarchies (production of goods and services by single integrated firm) [4]. Ref. [2] GVC framework, considered to be an extension of Williamson’s transaction cost economics (TCE) theory, offers intermediary networks or quasi-hierarchies [5] for interfirm relationship coordination and production organization in the form of modular, relational, and captive value chains. The existence of the various networks for the organization of production and coordination of interfirm relationships implies the existence of both vertical and horizontal linkage mechanisms.

Porter [6] argued that the existence of comparative advantage, economies of scale, and excessive vertical integration are no longer sources of competitiveness and innovation. He contended that close linkages between buyers, suppliers, and other institutions are now the source for firm, industry, and sector competitiveness, as reflected in productivity [7]. This statement affirms

¹For example, World Bank (WB), African Development Bank (AfDB), United States Agency for International Development (USAID), Department for International Development (DFID), International Development Research Centre (IDRC), Trust Africa, European Union, and African Union

that the level of strength of collaborative relationships in both vertical and horizontal linkages is the source for productivity gains.

According to Navdi and Halder [8], the cluster theoretical approach assists in assessing the gains of clustering (i.e., grouping similar objects) as a result of joint action, while the VC approach explores vertical linkages between firms and external actors. Although both approaches offer complementary synergies to each other, they do not elaborate on the measures applicable in assessing the strength of the interfirm relationships [2, 9]. This missing link is filled by the transaction cost economic approach [4], which analyzes investment transactional costs involved in interfirm relationships. Williamson [4] identified the transactional costs in the form of specific investment asset specificity, uncertainty, frequency of transactions, and opportunism. In this study, we contend that building supplier production capabilities involves undertaking investment asset specificity in terms of provision of inputs, knowledge, and skills transferred to primary producers with a purpose of building production capabilities for productivity gains. It also involves transactional costs related to searching, monitoring, and enforcement of contracts by either party, costs considered as eroding profit margins. More investments in building mutual trust relationships are crucial in order to minimize opportunism. This study adopted these measures in assessing the strength of collaborative vertical and horizontal linkages for the building of supplier production capabilities.

The purpose of this research was to contribute to the understanding of the link between the supplier/growers' production capabilities and productivity growth in the GVC of sugarcane and forestry sectors and as such offer some key insights into the emerging GVC theory. This was achieved by investigating the strength of value chain practices within both vertical and horizontal linkages between growers and buyers/millers and among growers. Therefore, this study undertook a comparative assessment of supplier production capabilities for achieving desired industry productivity gains in the commercial sugarcane sector relative to the forestry sector in Uganda. The following research questions guided the inquiry:

1. How does investment asset specificity in vertical and horizontal linkages explain performance differences between commercial sugarcane and forestry sector value chains?
2. How does coordination of transactional costs in vertical and horizontal linkages explain performance differences between commercial sugarcane and forestry sector value chains?
3. How do actors' behaviors in vertical and horizontal linkages explain performance differences between commercial sugarcane and forestry sector value chains?

2. Methodology

This research employed a case study approach as the major research strategy, with a survey complementing the results of the case study. The purpose of this research was to contribute to emerging GVC theory [2] and hence suitability of case study [10].

Field-based and multiple data collection methods (questionnaire survey, interviews, archives, and observations) were used to gather empirical data to address the research questions and for triangulation of results [10–14].

Industry-specific information sources such as Uganda Sugar Cane Technologist Association (USCTA), Uganda Sugar Manufacturers Association (USMA), and Sawlog Production Grant Scheme (SPGS) project provided expected industry productivity baselines [15–17]. The total number of registered producers was 389 of which 298 were functional as per SPGS performance report 2012/2013. Kinyara Sugar Works Limited provided growers productivity data for the years 2010/2011 to 2012/2013 financial years. The total number of out-growers in Kinyara Sugarcane Cluster was approx. 6000, of which 105 were registered and approximately 77 commercial producers were considered functional. The total number of anticipated respondents participating in the study was 100 (survey tool) and 20 (qualitative tool or interviews), from both forestry and sugarcane value chains. The response rate was 46 to the questionnaires and 9 to the interviews in forestry industry and 32 to the questionnaires and 10 to the interviews, respectively. The overall response rate was 81%. The sample size of 97 was generally found appropriate for studies of this nature, in line with [10] recommendation of cases between 4 and 10 as appropriate.

The cases involved in the entire value chain as the principal unit of analysis are explored and analyzed at three sublevels: micro (primary producers/growers' enterprises), meso (industry experts, miller's representatives, and association executives in the value chain), and macro (assessment of national policies and regulations). Principal component analysis was run for purposes of grouping items. Empirical data was analyzed using within case analysis that enabled intimate familiarity with each case as stand-alone entity and cross-case pattern analysis that enabled constant comparison of theory and data—iterating toward a fit between theory and data. **Figure 1** represents a summary of the methodology procedure.

2.1. Measures of productivity gains

Adam Smith [3] in his book of the wealth of nations identified three productivity measures, namely, farm output, manufactured goods, and labor to produce goods. This study was interested in productivity gains in agribusiness and therefore considered farm output as the leading measure for farm enterprise productivity. The study adopted country-specific industry reports published by the Uganda Sugar Manufacturers Association (USMA) which consider farm output of 100 tons/ha as the baseline productivity measure of sugarcane maturity of 18–20 months [17]. The forestry sector productivity reports were obtained from the Sawlog Production Grant Scheme, assessing performance of growers and providing indicative desired contract performance measures of 90% in agronomical practices.

2.2. Measures of strength in vertical and horizontal collaboration for building supplier production capabilities

In the context of value chain discipline, vertical linkages represent conduits for the transfer of learning, skills, information, technical, financial, and business services from one firm to another along the value chain. On the other hand, horizontal linkages represent longer-term cooperative

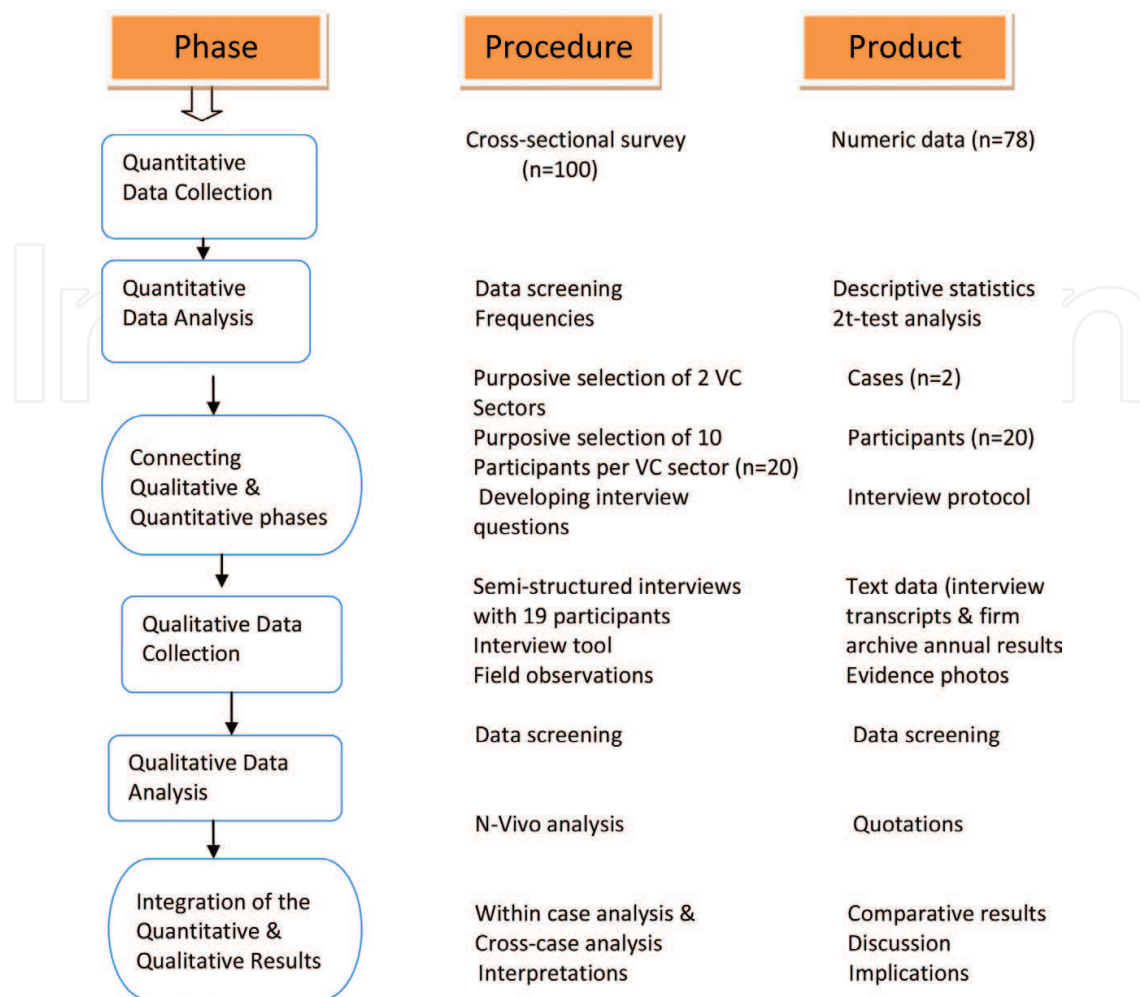


Figure 1. Research methodology flow chart.

arrangements among firms that involve interdependence, trust, and resource pooling in order to achieve joint action or jointly accomplish common goals.

The transactional cost approach provides measures for assessing the strength of the market coordination mechanisms [4]. The measures include investment asset specificity costs (such as knowledge, skills, and physical production inputs), coordination transaction costs (timely payments, information search, contract monitoring, and enforcement), frequency of the transactions, and quality of relationships, that is, mutually beneficial or exploitative relationships. This study adopted these measures except frequency of transactions in assessing the strength of vertical and horizontal collaboration in building supplier production capabilities in the value chains.

3. Results and discussion

Research question 1: How does investment asset specificity in vertical and horizontal linkages explain performance differences between commercial sugarcane and forestry sector value chains?

The findings of the study suggested strong collaborative vertical linkages for building supplier production capabilities, as can be attested with the two-sample t-test. A comparison of the mean value for asset specificity in vertical relationships revealed that there was a significant difference in the mean rating by sector (forestry-sugarcane), $Pr(T < t) = 0.0002$. This means that there was a stronger collaborative relationship between millers and producers for inputs support, knowledge, and skills transfer in the sugarcane sector compared to the forestry sector. However, a nuanced view by qualitative data revealed that transfer of knowledge, skills, and inputs support was through contractors and not directly to primary sugarcane producers as evidenced by the quotations below:

"Planning is one of the biggest problems. The basic thing which a farmer gives is land... since farmers get inputs and using contractors for land preparation, harvesting and transporting, this creates sluggishness. i.e. some farmers think cane is for Kinyara, but now we are telling them to take it as a business so that they can plan, and save. Further, many farmers have no records...we hope that if farmers take up operations, they will develop capacity and protect their investments" (Out-Grower Manager, Sugar Mill).

The out-grower manager's statement was also validated by a primary sugarcane producer as stated below:

"Under the previous miller, harvesting, loading and transporting were done by the farmers' company – which was the business arm of the association. When current management came on board, this was abolished and they preferred to use contractors. With the previous miller knowledge was gained; we used to have courses in Kampala which was helpful, however, with the current miller not much has been gained" (Respondent Sugar).

Therefore, the qualitative findings above suggest weaker collaborative relationships for building production capabilities between millers and growers in the sugarcane sector. Further, the quotation below corroborated the quantitative findings of weak collaborative relationships for building production capabilities between millers and growers in the forestry sector.

"No miller is supporting growers, Nile Ply just buys from growers but without supporting them" (Program Manager, SPGS/Forestry).

On the other hand, the forestry sector had strong collaborative horizontal linkages existing with respect to investment asset specificity. A comparison of the mean value for asset investment specificity in horizontal relationships revealed that there was a significant difference in the mean rating by sector (forestry-sugarcane), $Pr(T > t) = 0.0023$. This means that there was a stronger collaborative relationship among producers and/or producer support agencies for inputs support, knowledge, and skills transfer in the forestry sector than the sugarcane sector. The above quantitative data finding was supported by qualitative data findings below:

"SPGS support has enabled at least 30% to improve production planning skills.... The change is more than significant. availability of forest valuation guidelines also gives growers basics on what price they cannot go below (reserve price) during negotiations in order to realize a return on their investments" (Program Manager—SPGS/Forestry).

The quote above suggests that transfer of knowledge, skills, and inputs support occurred directly to forestry producers from development agencies. This was evidenced by the t-test results that showed very strong significant differences (forestry-sugarcane), $Pr(T > t) = 0.0000$, regarding access to both technical and financial support from farmers' development agencies.

This finding is also corroborated by both foreign and local tours (see **Figures 2 and 3**) organized by SPGS—a development support agency in conjunction with UTGA—the National Farmers Association, whose aim is to equip forestry growers with technical knowledge for building production capabilities.

The findings render support for strong horizontal collaborative relationships for building production capabilities. Findings also complemented with the evidenced adduced in the quotation below:

“Growers have acquired technical competency in plantation establishment, maintenance such as thinning, pruning, marking and harvesting....Good relationships exist, especially those under UTGA. When we call cluster meetings, we see the will to share, cooperate, and avail their plantations for study”
(Association General Manager, UTGA/Forestry).



Figure 2. Ugandan forestry commercial farmers learning and nurturing of quality tree seedlings. Source: Primary field data courtesy of SPGS study tour Mondi nursery facility (South Africa).



Figure 3. Ugandan forestry commercial farmers on networking and information sharing testing the strength of the pole required by the market. Source: Primary field data courtesy of UTGA/SPGS local study tour New Forestry Company Ltd—pole treatment plant in Uganda.

The statement by one of the growers below did not discount the above statements:

“Yes, knowledge through newsletters, client meetings... You access information on prices, even if someone (buyer/miller) comes with a monopoly, but he realises that you are able to chip in from an informed position” (Respondent, Forestry).

However, with respect to sugarcane sector, qualitative data further supported quantitative data that there were no gains in building production capabilities from horizontal collaborative linkages as evidenced with the quotation below:

“Percentage wise in knowledge and skills transfer is still low, ... the previous association (KSGL) incurred liabilities, hence farmers lost the trust but now picking up slowly” (Association Chairman, Sugarcane Sector).

Our observations on the question about the influence of investment asset specificity in vertical and horizontal linkages on performance differences between commercial sugarcane and forestry sector value chains is as follows. The sugarcane sector exhibited high investment asset specificity in vertical linkages between primary producers and millers. This was evidenced by quantitative data which suggested strong collaborative vertical linkages for building supplier production capabilities. However, a nuanced view of the qualitative data pointed to the existence of production capabilities in the vertical linkages but residing in the use of contractors rather than the cane growers themselves. This finding was supported by a study of small-scale growers in the South African sugar industry that arrived at similar results [18]. Therefore, this finding suggested that growers were heavily dependent on the millers and contractors employed by the millers to offer services to the contracted growers. It was this level of high dependency of growers upon millers that could offer plausible explanations for failure to develop production capabilities among most growers in the Ugandan sugarcane sector.

On the other hand, quantitative data revealed a stronger collaborative relationship among producers and/or producer support agencies for availing inputs, knowledge, and skills transfer in the forestry sector than the sugarcane sector. This finding was corroborated by qualitative data and validated by observatory field data, which confirmed that the transfer of knowledge, skills, and inputs support occurred directly to forestry primary producers. This was done by development partner agencies through provision of both technical and financial support accompanied with foreign and local exposure learning platforms (see **Figures 2 and 3**), with a purpose of building production capabilities for achieving productivity gains. This finding supports the GVC literature, as argued by GVC proponents such as [19, 20] that a combination of technical and investment support in highly governed chains explains how relatively underdeveloped regions become major export producers in a short period of time. They cited the example of the Brazilian shoe industry in the 1970s and the Vietnamese garment industry in the late 1990s. Made a similar observation in his study of the textile and garment supply chain in South Africa [14]. He found out that companies that had closer collaboration in training and assistance attained a higher diffusion of skills in a shorter time to achieve supply chain efficiency levels required to compete effectively. This scenario can be described as a true reflection of Uganda’s evolving commercial forestry sector, which enjoys support from development agencies and producer associations that links both primary producers and millers.

Further, the proponents of the cluster theoretical framework argue that diffusion of production capabilities is not only limited to GVC participants, but there is also knowledge and skills “spillover” in a geographical area and/or localities of business operations [8, 21–26]. They argued that impact of knowledge and skills “spillover” accounts for the rise of entrepreneurship in various forms such as functional upgrading, new entrants in the existing clusters and value chains, and the start of new parallel competitive value chains. This entrepreneurial potential can be said to be available especially in Uganda’s commercial forestry value chain sector, only if other agro-commodities can have a ready market for commercial production.

The findings above explained the investment asset specificity in vertical and horizontal linkages for interfirm relationships. However, as firms engage in the exchange process, they may be vulnerable to coordination transactional costs and opportunism by either party involved in the execution of the contracts. The next section presents and discusses comparative results with respect to vulnerability to transactional costs in both vertical and horizontal collaborative relationships for building production capabilities in order to achieve productivity gains.

Research question 2: How does coordination of transactional costs in vertical and horizontal linkages explain performance differences between commercial sugarcane and forestry sector value chains?

A comparison of the mean value for transactional costs in vertical relationships shows that there was a moderate difference in the mean rating by sector (forestry-sugarcane), $P_r(T < t) = 0.0266$. This means that transactional costs such as delayed payments from millers to producers and information search for production costs were perceived to have been more of a challenge in the sugarcane sector than the forestry sector. This finding was supported by qualitative data suggesting weaker collaborative relationships between millers and growers in the sugarcane sector, as per quotations below:

“Enough money and/or cyclic revenue is needed to run the business but KSL has a tendency of late payments going between 60–90 days. The delayed payment causes unnecessary interest accruals resulting into marginal profits” (Respondent, Sugarcane Sector).

“Initially we used to give cash advances to purchase plantations, and provided transport. However, the system was abused whereby some suppliers diverted the funds into other businesses... currently, we pay them within five working days after delivery to enhance their cash flow and introduced suppliers to Eco-bank for loan access. Right now the suppliers are self-sufficient, they can support themselves” (Plant Manager, Forestry Mill).

“The main challenge is the continuous reshuffle of ministers; before a minister gets acquainted with the industry another one is appointed. Even now the permanent secretaries are being transferred. At one time we broke down the costs to Minister Mukwaya. The minister requested the miller to give her the breakdown, but the miller refused. Recently, another meeting was organised with the Ministry of Trade, Industry and Cooperatives (MTIC) involving both out-growers and millers. The out-growers gave their cost breakdown of approx. 60 percent but the miller declined to give a cost breakdown” (Respondent, Association Executive Member and Opinion Leader (Sugar)).

The quotations above revealed that cost of searching for production costs of the value chain did not only impact upon transactional costs but also the reluctance by millers to reveal their production costs suggested possibility of opportunistic behaviors.

Our observations therefore are that some level of vulnerability to transactional costs between millers and growers in the sugarcane sector exists, compared to the forestry sector. However, similar results were obtained in the horizontal relationships in the forestry sector in comparison to the sugarcane sector. Using two-sample t-test, a comparison of the mean value for transactional costs in horizontal relationships shows that there was a slight difference in the mean rating by sector (forestry-sugarcane), $Pr(T > t) = 0.0548$. This means that there was suggestive evidence of minimum occurrence of transactional costs among producers in the forestry sector than the sugarcane sector. This quantitative finding was validated by the qualitative data finding below, which suggested occurrence of transactional costs as a result of replacing labor force taken by another grower without the consent of the labor force owner:

"I think we trust each other because we have same common ground. I have not seen many conflicts in client meetings, except one time a farmer accused his neighbors of stealing his workers." (Respondent, Forestry).

Therefore, on the question of the impact on performance differences between commercial sugarcane and forestry sector value chains regarding coordination of transaction costs within vertical and horizontal linkages, we concluded as follows. Moderate transactional costs such as information search costs and delayed payments from millers to producers were more of a challenge in the sugarcane sector than the forestry sector. This finding supported existence of weaker collaborative relationships between millers and growers for building production capabilities in the sugarcane sector. In the forestry sector, quantitative data revealed evidence of minimum occurrence of transactional costs among producers compared to the sugarcane sector. This quantitative finding was corroborated by the qualitative data finding which suggested occurrence of transactional costs as a result of replacing labor force taken by another grower without the consent of the labor force owner.

The above findings demonstrate that both vertical and horizontal collaborative relationships between primary producers and millers and among primary producers in the sugarcane and forestry industry value chains were vulnerable to some levels of transactional costs. Evidence of transactional costs suggests existence of opportunistic behaviors [4, 27]. Opportunistic behaviors were investigated by this study in the next question below.

Research question 3: How do actors' behaviors in vertical and horizontal linkages explain performance differences between commercial sugarcane and forestry sector value chains?

Vulnerability to transactional costs is mainly attributed to opportunistic behaviors. A comparison of the mean opportunism in vertical relationships revealed that there was a slight difference in the mean rating by sector (forestry-sugarcane), $Pr(T < t) = 0.0712$. This means that there was suggestive evidence of opportunism causing mistrust between millers and producers in the sugarcane sector than the forestry sector. This finding was validated by qualitative data findings below:

"Fairly good trust... however there is lack of transparency on the weigh bridge" (Association Chairman, Sugarcane Sector).

This above quotation was supported by the miller's representative quotation below suggesting some level of opportunistic behaviors along the sugarcane value chain.

"Small farmers are mainly the problem because at times they sell the fertilisers, but with commercial farmers, this is not quite rampant" (Agricultural Engineering Manager, Sugar Mill).

Generally, the finding of suspicious opportunistic behaviors between growers and millers validates the existence of weak collaborative relationships for building supplier production capabilities. On the other hand, a comparison of the mean value for opportunism in the horizontal relationships shows that there was no significant difference in the mean rating by sector (forestry-sugarcane), $Pr(T > t) = 0.1380$. This meant that manifestations of opportunistic behaviors were not quite rampant among producers in both the forestry and sugarcane sectors.

Therefore, in answering the question on how actors' behaviors in vertical and horizontal linkages explain performance differences between commercial sugarcane and forestry sector value chains, we observed the following. Quantitative data revealed suggestive evidence of opportunistic behaviors causing mistrust between millers and producers in the sugarcane sector than the forestry sector. This finding was validated by qualitative data that suggested the source of mistrust being due to lack of transparency of the miller's weighbridge and possibility of diverting inputs by growers to other farm activities rather than sugarcane growing.

The above findings show that vertical collaborative relationships between primary producers and millers in the sugarcane industry value chains were characterized by suspicion, thus affecting mutual trust as compared to the forestry sector value chain. This finding is in agreement with similar studies, which found out that mutually benefiting relationships develop trust [14, 28], while exploitative relationships exhibit low levels of trust and tend to be characterized by tensions that affect productivity gains in the value chains [29–31]. This was found to be true in Uganda's sugarcane sector value chain. In such circumstances, the GVC theoretical framework recognizes that reshaping of the value chain governance structures lowers opportunistic behaviors accounting for vulnerability to transactional costs [2, 32]. Our finding on this question also points to the potential to increase participation market powers by the Uganda's sugarcane primary producers through shifting away from a captive value chain governance structure characterized by high levels of dependency, to either a modular or relational value chain governance structures, characterized by less dependency.

On the other hand, findings of the study revealed that manifestations of opportunistic behaviors were not quite rampant in the horizontal relationships among primary producers in both the forestry and sugarcane sectors. This finding indicates that there are opportunities for primary producers especially in the sugarcane sector for joint action investment strategies in order to minimize opportunistic behaviors causing transactional costs in vertical linkages.

4. Conclusion

The key findings of the study revealed that (1) the sugarcane sector exhibited high investment asset specificity in vertical linkages between primary producers and millers compared to the

forestry sector. This finding suggested strong collaborative vertical linkages for building supplier production capabilities to enhance productivity gains. However, a nuanced view of the qualitative data pointed to the existence of production capabilities in the vertical linkages but residing in the use of contractors rather than the cane growers themselves. On the other hand, stronger collaborative relationship existed among producers and/or producer support agencies for availing inputs, knowledge, and skills transfer in the forestry sector than the sugarcane sector. This finding was corroborated by qualitative data and validated by observatory field data confirming building of production capabilities among forestry primary producers for productivity gains. (2) Findings of this study revealed that control of the diffusion of knowledge and skills transfer not directly to primary producers, but through the use of contractors, was a strategy that enabled the miller(s) to continuously earn higher rents by offering low commodity prices, inputs, and services at high prices to the sugarcane primary producers through maintenance of weak supplier production capabilities. (3) Opportunistic behaviors accounted for the prevalence of suggestive evidence of transactional costs between miller(s) and growers in the sugarcane sector compared to the forestry sector. The above key findings also offered plausible explanations for the observed performance differences in achieving industry productivity benchmarks between sugarcane and forestry sector primary producers. Study results indicated that only 18% of the farmers achieved the desired industry productivity output of at least 100 t/ha from their cane fields, implying that majority (82%) of the cane growers were producing below expected industry productivity output. This was in contrast to the forestry sector whose study results indicated that 41.3% of the farmers achieved the desired industry performance targets, suggesting that only 58.7% of the growers performed below expected performance targets.

5. Theoretical and policy contributions

Theoretically, this study has brought into insight new research frontiers. The dominant theoretical argument within the GVC discipline is that while highly governed structures contribute to fast acquisition of production capabilities, they can also create barriers for functional upgrading and/or investments in forward linkages [19, 33]. This is because the lead firms protect their core capabilities such as acquisition of design and marketing capabilities from competition, in order to sustain earning higher rents. The findings in our study added another perspective by showing that the lead firms created barriers in backward linkages by controlling the diffusion of knowledge and skills transfer not directly to primary producers, but through the use of contractors. This strategy enabled the miller(s) to continuously earn higher rents by offering low commodity prices, inputs, and services at high prices to the primary producers through maintenance of weak supplier production capabilities. Therefore, this finding can be classified as a major contribution to the emerging GVC theoretical framework [2], with respect to lead firms' control of the diffusion knowledge and skills for building supply production capabilities in backward linkages, with intent for sustained earning of strategic rents.

This study provides insights to government and development partners' policy regarding development of supplier production capabilities for productivity growth in the context of GVCs as follows:

1. Policy program interventions need to be designed in a way that knowledge and skills will be made available to the primary producers. This will enable them to strengthen their production capabilities for effective participation and upgrading in the GVCs in developing economies.
2. Policy programs should be supported by the formation of robust primary growers' associations and/or cooperatives that provide a platform for joint action to effectively participate in GVCs.

Acknowledgements

Appreciation to the European Union, the Government of Norway and the Government of Uganda for the technical and financial support to Sawlog Production Grant Scheme (SPGS) and Uganda Timber Growers Association (UTGA) under the SPGS II Grant FED/2012/296-198. Management of Kinyara Sugar Works Limited provided the necessary information and accessibility to research participants. This paper is part of a PhD Program at the Graduate School of Business, University of Cape Town.

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