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Keywords: supplier development, supplier training, supply base, material flow, sugar millers and sugarcane enterprises.

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Influence of Supplier Training on Performance of Sugarcane Enterprises in Kenya

Fredrick A. Nasiche [α], Dr. P. Karanja Ngugi [σ], Dr. David Kiarie [ρ] & Prof. R. Odhiambo [ω]

Abstract- Manufacturing firms are increasingly using supplier development to address gaps in their supply base aimed at improving their performance. There has been a decline in sugarcane yield in Kenya yet, the demand for sugar has been increasing steadily over time. Drawing on the supplier training aspect of supplier development strategy, the study objective was to establish how supplier training impacts on performance improvement of sugarcane enterprises in Kenya. The study hypothesis was that there is a significant positive relationship between supplier training and the performance of sugarcane enterprises in Kenya. The study was premised on a descriptive research design and a sample size of 400 drawn from a population of 250,000 active farmers was used. A pre-test of 10% was done to check on the reliability and validity of the data collection instrument. 400 questionnaires were issued out and 293 were returned, achieving a 73.25% return rate. The results of simple linear regression show an r= .347, p value=0.000. It was inferred that there was a significant and positive correlation between supplier training and the performance of sugarcane enterprises in Kenya. Similarly, the result shows an R2 value of .121 implying that 12.1% in variation of performance of sugarcane enterprises in Kenya was accounted for by supplier training. The regression result β= 0.203, t value of 6.253. The results show that if the rest of the variables in the model were controlled, the sugarcane yield would be 2.415 units. The research hypothesis was supported and the study concluded that supplier training had a positive influence on sugarcane enterprises in Kenya. The study recommends that sugar millers should establish demonstration plots to train farmers in modern sugarcane farming; develop a policy that would facilitate the signing of contracts with farmers to facilitate material support to farmers and address the issues of technical inefficiencies in sugarcane farming in Kenya. Further studies are recommended to gain insights explore where sugarcane is grown under the contract regime as compared to sugarcane grown under the liberalized settings to provide empirical evidence on the constraints arising from the technical allocative inefficiencies that embed full exploitation of supplier development strategy in sugarcane farming in Kenya.

Keywords: supplier development, supplier training, supply base, material flow, sugar millers and sugarcane enterprises.

CITATION.

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I. Introduction

Manufacturing firms try to achieve uninterrupted flows of material resources required for their conversion process into the organizations through the adoption of sourcing strategies that place their suppliers at the center of their operations. One of these sourcing strategies is supplier development, which is a strategy adopted to empower suppliers through the process of direct investment of resources in the supplier to augment and upgrade their operational abilities to enhance performance objectives. Joshi *et al*., (2017) opined that the buyer's supply base needs to be self-sufficient and could be realized through supplier development initiatives. Indeed the central role the strategy plays is supported by the available modeling and evaluation analysis that goes into assessing the effects of supplier development on performance improvement of both the buyer and supplier (Dou *et al*., 2014). Usually, there exist some shortcomings in the supplier's ability to meet buyer expectations concerning material flow (Busse *et al*., 2016).

The stream of supplier development research has provided empirical support and assertions that supplier development improves performance metrics such as delivery time, quality, cost reduction, quantity, and profit (Blome *et al*., 2014; Dalve & Kant, 2015; Dalve & Kant, 2018). Glock *et al*., (2017) are of the view that supplier development is one way of the manufacturer getting involves in shaping and influencing the supply base with a view of propelling the vocal company to gaining competitive advantage.

There has been a shift from the stand-alone strategies arising from the competitive pressure and production requirements, to more supplier collaborative and supportive strategies to access the needed resources by the manufacturing organizations (Bai & Sarkis, 2014). These collaborative and supportive strategies include supplier development which is described as a way of deriving financial and material resources to support the manufacturer's present and future operational needs. The adoption of supplier development strategy is informed by the prevailing uncertainties in the supply market dominated by various forms of supply risks and the attendant supply chains that result in material shortages (Scur & Kolososki, 2019). Besides, the realization that most buyers do not have the required raw material in the house and the

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influence that suppliers exert on buyer performance have been a major driving force behind the adoption of supplier development.

The complex nature of organizational supply chains owing to the number of participants, stage in the development of each participant, and networks make it mandatory for a buyer to engage in a close working relationship with suppliers to secure sustainable flow material from outside sources (Trapp & Sarkis, 2016). Supplier development is defined as the "long-term investment relationship between the buying firm and the supply base intended to improve their capacity to meet the buying firms' resource needs sustainably (Routroy & Pradhan, 2014). The strategy is about ensuring that the buyer has access to the required resources that are domiciled outside its boundaries and are necessary for the manufacturer's operations and routines in meeting its marketing and customer objectives (Wang & Gunasekaran, 2017). The dependence by buyers on suppliers for raw material supplies reflects the relative importance both parties attach to the relationship and the value created by their actions in supplier development. Notably, the ability to achieve the intended goals is determined by the strategic importance each part attaches to the supplier development initiative. Roloff *et al*., (2015) opined that it is important to consider the interests and views of both the buyer and supplier before the implementation of supplier development programs.

In practice, supplier development may take the form of direct or indirect programs. The direct programs required a lot of capital input by the buyer whilst indirect programs require less capital input and involvement. Proch *et al*., 2017 and Lawson *et al*., 2015 emphasized that the direct supplier development paradigm requires substantial human, financial, and material deployment by the buyer to achieve desired results. Specifically, an initiative such as supplier training that is supported by the buyer to empower the supplier with the required skills and capabilities can go a long way in improving the performance of both the buyer and supplier (Lawson *et al*., 2015; Mohanty *et al*., 2014). Competition in the market has shifted the traditional areas based on cost leadership to supply chains, where the buyer is in the driving seat to influence the flow of material resources into the organization to supports its manufacturing activities in tandem with the customer satisfaction needs (Glavee-Geo, 2019).In most cases tradeoffs are required to balance the needs of the company and the customer, resulting in customer focus paradigm supported by reliable supply chains.

The direct supplier development aspect of training and education is an important factor in the transfer of skills and capabilities to a supplier at the cost of the buyer. Yawar & Seuring (2020) found that training and education of suppliers has a positive impact on the performance improvement of both the buyer and the supplier. The supplier dependency scenario and the need of the buyer to maintain its market share by striving to meet customer needs exceedingly may drive the buyer to invest in supplier training and education. Training and education of supplier firm employees have been a game-changer in the effort by manufacturing companies by viewing social and economic dimensions as the basis of competition derived from the market needs of their customers. This assertion is in line with that of Guo-Ciang (2017) that emphasized training and education aspects of suppliers in matters of socially responsible supplier development to improve the sustainable performance of small and medium enterprises. According to Marti *et al.,(*2015) where suppliers are trained in sustainable development issues relating to products and services, it results in economic, social, and environmental performance improvement, with benefits accruing to the supplier, buyer, and society.

Globally, supply chains have shaped and changed the dynamics of competition based on their value creation abilities among the market players. Tanskanen (2015) argued that since buyers depend on the supply chains of their suppliers to compete, they have no other option but to invest in the training of their suppliers to leverage their resources. Critical requirements to support value creation operation of the buyers usually reside with suppliers, hence buyers must go to great length to build collaborative relationships with suppliers that are aligned and support their overall corporate and functional strategies.

Reliable suppliers for sugarcane in the Kenyan sugar industry are rare to come by, necessitating sugar millers to identify and train sugarcane farmers in modern farming methods to argument sugarcane products to meet the demands of the millers. Training as a dual-action involving farmers and millers results in concurrence of farmers' and millers' strategic priorities in line with the overall view of the sugar industry policy anchored on the Government of Kenya vision 2030 strategy. An extensive literature review reveals that supplier training is an essential component of supply chain performance, particularly in regards to performance improvement of suppliers and buyers (Busse *et al*., 2016). Informed by the desire to improve sugarcane yield in Kenya to ensure a steady flow of raw material to support value addition activities of sugar millers, it is expected that training of suppliers (farmers) has a turnaround effect on sugarcane shortage in Kenya. Accordingly, informed by empirical evidence that training as a direct supplier development is essential for the smooth functioning of supply chain networks; it is considered a worth feature to explore concerning the performance of sugarcane enterprises in Kenya, drawing on the sugarcane farmers paradigm.

The Kenyan sugar industry has evolved from a single factory at inception to over ten factories to date.

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The Government considers the sector as a reliable source of income arising from the sale of sugarcane and employment; and significantly impacts the national economy (Mwanga *et al*., 2017). Sugar manufacturers wholly depend on private farmers for the supply of cane for crushing as their nucleus farms produce less than 16% of the total cane crushed in Kenya (Mati & Thomas, 2019). The sugar industry suffers from many challenges that include dilapidated machinery, ineffective policy, lack of financial support, lack of spare parts for maintenance, completion from importers who hardly pay requisite taxes, and under capacity utilization (Mati & Thomas, 2019). Under -capacity utilization is a result of an acute shortage of sugarcane occasioned by lack of a clear policy by the millers to support sustainable sugarcane development programs (AFA, 2015; USDA, 2017). The sugarcane shortage has limited miller from exploring other viable but untapped revenue streams like cogeneration and ethanol production.

Cumulatively, under-capacity utilization leads to a shortage of sugar as demand outstrips supply. According to USDA (2018), importations to meet the shortage usually operate to distort the market in favour of the importers. Meeting the requirements of customers remains a critical factor that dictates the value addition process in pursuit of competitive advantage. The reliability of the raw material supply base determines the success and improved performance of a company in the market. The desire to have a reliable source of sugarcane supply provides a considered justification for millers to confer sugarcane farmers with requisite innovative skills in modern farming through training and education as a direct supplier development strategy.

The traditional performance paradigm in business is usually evaluated based on profit attained, market share, and improved shareholder value. Mishra *et al.,* (2018) indicated that performance measurement lays out variables that help to quantify the effects of actions already taken to justify the outcomes. Supply chain performance is about how well the supply base supports operations of the focal buyer based on specific attributes. Similarly, Mishra *et al*., (2018) assert that the supply chain supports the achieving efficiency, effectiveness, and goals of an organization .These actions are motivated by the urgency to grow the organization towards meeting their customer expectations measured in terms of economic dimensions of quality, delivery time, quantity, and cost (Jagan *et al*., 2019).

According to Busse *et al*., (2016) rise in globalization and an informed global consumer has led to the inclusion of non-economic attributes of products like the use of reusable materials, waste disposal, pollution, and recycling performance evaluation of supply chain actions. Sugarcane farming performance measures are in terms of yield per and the quality of the cane evaluated based on sucrose content that determines the amount of sugar produced per ton (AFA, 2015). Training of farmers in modern farming methods viewed from the supplier development perspective of the integrated supply chain improves sugarcane yields resulting in the availability of raw material to support millers' ability to produce sugar to meet the demand of the country.

II. Statement of the Problem

Production of sugar has not kept pace with the demand. This is attributable to the idle capacity experienced by sugar millers due to shortage of sugarcane for crushing (Mati & Thomas, 2019). The average production yield per acre has declined leading to unscheduled production stoppages arising from sugarcane shortage (AFA, 2015). The shortage of sugarcane is attributable to poor cane husbandry, composition of plant population on the farms being predominantly of ratoon 2 and 3 crops, cost of inputs and unhealthy completion leading to harvesting of immature cane (AFA, 2015; Mati & Thomas, 2019). Mwanga, Ongala and Orwa (2017) developed a sugarcane yield prediction model that revealed a decline in sugarcane production from a high of 60 tons per hectare in 2016 to a low of 51.48 tons in 2018.

Demand for sugar has been on a steady rise due to increase in population and industrial activities (USDA 2018). However, the increased demand is not supported by corresponding increase in production in a drive for the country to attain self-sufficiency. Shortage of cane has been linked with changes in regulations governing the growing and sale of cane. Liberalization of the cane market has resulted in withdrawal and/or scaling down of services such as farmer training and extension outreach previously offered by the millers. Consquently, this resulted in under capacity utilization which creates a shortage in the market leading to importation of sugar to bridge the gap (AFA, 2015; USDA 2018). According to Dubb (2014) decline in sugarcane production by small scale farmers in KwaZulu-Natal province, South Africa was as a result of regulatory changes that limited sugar millers' support for farmers.

In Kenya, sugar millers supply less than 17% of sugarcane from their own nucleus estates, while 93% is supplied by farmers, thus suagcarne farmers are major stakeholders in the sugarcane supply chain (Mati & Thomas, 2019). The dependency of sugarcane millers on farmers as the source of raw materials provides a justification for millers to invest in farmers through provision of training and extension services to farmers. Investing in farmer training seeks to impart modern innovative farming techniques that would result in improved sugarcane yield and cane quality measured by the amount of sucrose content. Supplier (farmer) training is a proactive sourcing practice promised on

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supplier development that is intended to influence and augment the supplier capacity to ensure uninterrupted flow of sugarcane to support operational and production needs of the miller to meet the market demand of sugar and competitive advantage (Hernandez-Espallardo *et al.*, 2010; AFA, 2015; Mati &Thomas, 2019).

a) Objective of the study

The objective of the study was to establish how direct supplier aspect of supplier training impacts on performance improvement of sugarcane enterprises in Kenya. Specifically, the study endeavoured to determine whether supplier training enhances the performance of sugarcane enterprises in Kenya.

III. Literature Review

a) Conceptual framework

The conceptual framework depicted in Figure 1 shows how the variables Supplier training and performance of sugarcane enterprises in Kenya were hypothesized and operationali zed. The study tested the research hypothesis stated as- Ha1: There is a significant positive relationship between supplier training and performance of sugarcane enterprises in Kenya. The construct supplier training was examined based on inputs, planting, and weeding settings, complemented and supported by miller's field agricultural extension staff. Training of farmers on the correct use of the type, amount, and time of fertilizer application is crucial in the quantity and quality of cane yield. Training of farmers on the aspects of planting the right seed cane with proper spacing and prior land preparation enhances sugarcane yield per acre. Similarly, training of farmers on manual weeding and pest control using herbicide and pesticides are critical in enhancing sugarcane yield. When sugar millers use their agricultural extension staff to undertake farm visits, farmers open field days, and miller-owned demonstration plots, it helps to impart practical knowledge in modern farming techniques. Cumulatively, the training of farmers cultivates a positive relationship with the millers resulting in enhanced sugarcane production.

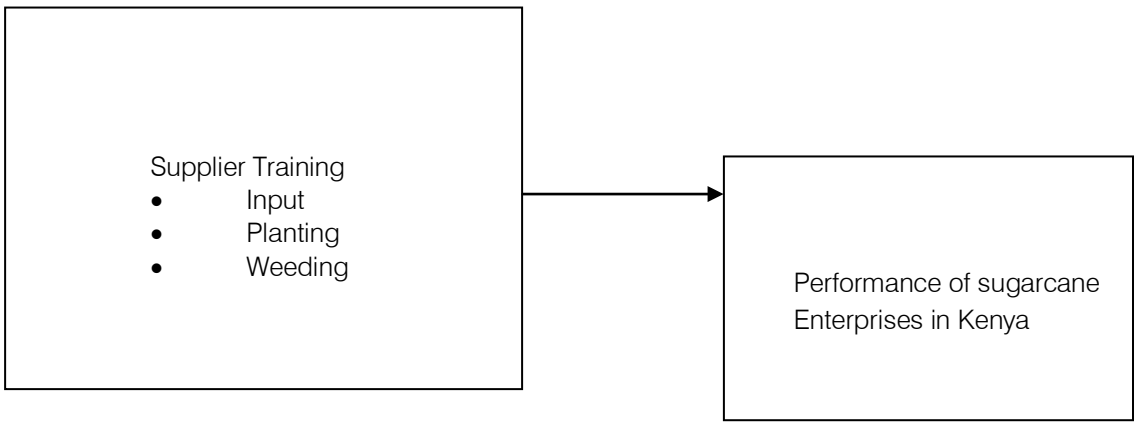

Figure 1: Conceptual framework

b) Theoretical Review

i. *Human Capital Theory*

Human Capital Theory has predominantly been used in the labour aspects of employees, especially in the drive for production improvement. The theory was formally introduced by Schultz in 1961. The theory has gained use by supply chain scholars to explain the phenomenon of supply chain resource requirements. Human capital is made up of assets of intangible resources owned by people as a result of training; education and work experience (Cooper *et al*., 2016). Consequently, the bundles of these acquired resources confer to the employer and the employees the leverage to use them in the enhancement of improved production that benefits both parties. According to Hohenste in *et al*., (2014) firms engage in many different activities that extend beyond their boundaries in search of resources that support their operations to ensure their competitiveness in the market. These activities are many and include supplier (farmer) training which would confer the necessary capabilities to enable the farmer to increase sugarcane production.

The resource-based view theory supports the human capital theory in that training of suppliers by the firms enables them to acquire skills that accrue for the benefit of competitive advantage (Huo *et al*., 2015). The complexity and dynamism in the supply chain emanating from the unstable environment makes it prudent for manufacturing firms to invest in training their suppliers who in turn guarantee consistent inflow of materials resources to support their material need. Training of farmers in modern sugarcane farming techniques is a direct supplier development sourcing strategy that would enhance the availability of raw material to support production. The human capital theory provides an appropriate basis to support the investment of millers in training farmers by imparting

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appropriate skills and techniques to improve sugarcane production, which in turn will eliminate chronic sugarcane shortages being experienced in Kenya. The human capital in sugarcane sector consisting of farmers can help improve the availability of raw material which would minimize the possibility of production stoppages, thus enabling the industry to gain a competitive advantage (Gonzalez-Loureiro *et al*., 2014).

c) Supplier Training

Training and education of suppliers seek to upgrade the capabilities of suppliers that have gaps in their operations. Supplier development reinforces the reality that a reliable supplier is a foundation upon which firms compete; training provides the platform and conditions necessary to access to resources of the supplier (Vos *et al*., 2016). Still, buyers allocate their resources to the training of suppliers to transfer the skills and capabilities to the employees of the supplier to gain preferred customer status based on the reciprocity principle (Pulles *et al*., 2016). Supply chain scholars assert that buyers consider suppliers as enablers in achieving competitive advantage; they are the source of critical resources that support their operation, and buyers are willing to invest resources to build a long-lasting relationship with suppliers through supplier development.

Training of suppliers is a valuable proactive and deliberate strategy of building long term business relationship that is beneficial to all the parties involved in the transactions. Accordingly, buyers implement supplier development strategies as part of supply chain management efforts of seeking and influencing their supply base as an avenue of accessing resources owned by the supplier but are critical in the operations of the buyer (Ellegaard *et al*., 2017). Moreover, putting efforts in training of suppliers is consistent with the social exchange theory based on the notion that training of suppliers is an investment by the buyer expecting the supplier to exchange resources with the buyer in a business transaction that results in mutual attraction and long-lasting business relationships (Bemelmans *et al*., 2015).

Training and education of suppliers may also be viewed as the process through which the buyer initiates actions that would provide resources for use by the buyer and supplier to improve in performance. Consistent with supplier development strategy as a building block to the buyer-supplier exchange relationship, each party must strive to convince the other party to invest in the relationship (Tanskanen & Aminoff, 2015). To this end, therefore, the quality of the expected relationship outcomes consisting of economic and non-economic must be capable of meeting the parties' present and future requirements. Consequently, the training of suppliers creates relational resources that provide a means through which there is a balanced exchange between the buyers and the sellers that results in mutual benefits and improved performance.

d) Empirical Review

The sourcing strategy adopted by a firm depends on the importance attached to the material. A critical material to support the operation of the buying firm and the spend on the material involved dictates that more attention is put in securing the source of supply. Training suppliers is a strategic avenue through which critical material required to support the operations of the buyer is controlled and managed. Glavee-Geo (2019) conducted a study on supplier development as a means to establish customer satisfaction and sustenance of the relationships. The study was undertaken in the Ghana cocoa production area. A sample size of 444 small scale cocoa growers was used as key informants. Six constructs were developed to evaluate the phenomenon. The supplier development construct had six-item sub-constructs that included training and education. Structured questions were used in face to face interview to collect data from the informants. All items under all the constructs had factor loadings of 0.7 and above. Structural model estimates and post- havoc analysis was used to analyze data and draw conclusions. The study established that supplier development activities had a significant and positive effect on supplier performance. Therefore it was concluded that establishing a reliable source of supply is critical to improving the performance of the buyer, hence investing in supplier training is justified.

Supply chain management is faced with many challenges both locally and globally. These challenges are risks to lead to interruptions of material flows. Supply chain practitioners implement different strategies aimed at minimizing the effects of such risks. Busse *et al*., (2016) undertook a case study on supplier development with the underlying issues of sustainability in the global supply chain barriers. Sustainability in supplies has become the focus of many scholars because of the immense benefits that accrue when the economic and noneconomic goals of the exchange partners are achieved. The design was an exploratory case study with a focus on WBF (Europe) that has a strong foothold in the packaging, diary, and aluminum industries in China. WBF has been hailed as a company that works closely with its customers and suppliers. Specifically, the company is known to offer training to farmers and education to consumers of their products. Items under this study included technical training and education of suppliers, communication, and knowledge transfer.

A sample size of 10 executives from WBF and 31 from six Chinese suppliers was drawn. Data were collected through interview and in some triangulation method was adopted. Data were analyzed by applying qualitative content analysis. The study findings indicated that in the context of global supply chain barriers, the

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actor must be informed and assessed on economic, social, and environmental future consequences. Consequently, training, education, and knowledge transfer can improve performance sustainable supplier development goals of the buyer and supplier.

A study by Subramaniam *et al*., (2019) set out to establish the impact of global manufacturers from the socially responsible supplier development perspective. The purpose of the study was to test the impact of supplier development programs on the social outcomes of suppliers. Multinationals distribute their products beyond their operation domains and as such are likely to influence the adoption of suppliers' sustainable practices. Furthermore, multinationals because of their geographical reach are in a strong position to influence the formulation of policies and regulations by governments in developing countries that often suffer from a weak regulatory environment as opposed to developed countries (Akamp & Müller, 2013).

A sample size of 141 multinational operating in Malaysia was chosen. Nine constructs were developed; among them was the supplier development. This construct was measured by four items that included training and education of suppliers. The study used a questionnaire survey to gather data from 141 informants and data was analyzed by the use of partial least squares structural equation modeling method. The findings indicated that supplier development had a significant positive influence on suppliers' social performance. This is a demonstration that multinationals supplier support enhances the ability of suppliers to improve their social performance.

Manufacturing firms always strive to upgrade the skills, competencies, capacities, and capabilities of their supply base networks. This is achieved through structured training programs that facilitate relationship building. Similarly, relationship development is built along with the improvement of the operational performance of the parties involved. Shahzad *et al*., (2016) provided empirical evidence that firms that implement supplier development improve operationally, quality, and delivery performances. The assertion was in contrast to the findings of Chae *et al*., (2017) that buyers use power to gain commitment and compliance with the suppliers.

IV. Research Methodology

A descriptive research design was adopted for this study supported by the cross-sectional survey. The design was considered suitable due to the geographical scope of the study area, the resources required, methods of data collection, and analysis involved in to generate useful information (Cooper & Schindler, (2012). The design offered a suitable avenue to collect data from several farmers in specific milling zones. It aided the study to empirically test direct supplier development as conceptualized through supplier training and performance of sugarcane enterprises in Kenya. This type of design has previously been used by Imbambi *et al*., (2017).

The population of 250,000 contracted and private small scale farmers spread across all public and private millers in Kenya was used for this study. A representative sample was selected considering ease of data collection, cost, geographical reach, sufficient statistical power, estimated measurement variability, significance criterion, and the level of precision (Singh & Masuku, 2014). Stratified sampling and simple random sampling techniques were used in the selection of informants since the population under consideration constituted different groups affiliated to different millers. The informants were stratified and distributed to each miller in proportion to acreage under sugarcane cultivation by the miller. The Yamane (1967) formula was applied to determine the sample size, where 95% confidence level and P-values 0.05 were assumed. This method was also used to calculate a sample size from a large population by Lusuli *et al*., (2017).

$$n = \frac{N}{1 + N\,(e)\,2} \quad \ldots\ldots\ldots\ldots \text{(Yamane, 1967).}$$

Where: n = sample size
N = population size
e = level of precision (0.05)

Therefore

$$n = \frac{250{,}000}{1 + 250{,}000(0.05)2} \quad 400.$$

The study established a representative sample of 400 farmers, distributed proportionally to each miller as shown in the table 1.

Table 1: The Sample Design

Company	Acreage	Population	Proportion	Sample size
Chemelil	14730	2008	8.0 %	32
Muhoroni	16538	22464	9.0%	36
Kibos	4394	5968	2.4%	10
Butali	18538	25180	10.1%	40
West Kenya	24871	33783	13.5%	54
Nzoia	25124	34127	13.7%	55

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Mumias	40608	57336	23.0%	92
Sony	16123	21901	8.8%	35
TransMara	12012	16314	6.5%	26
Sukari	9511	12919	5.2%	21
Total	184052	250,000	100%	400

Source: Kenya Sugar Board (2015)

A questionnaire developed after a review of available literature was used as a tool to collect primary data and report the responses. It was considered cost-effective and easy to administer (Neuman, 2013). The questionnaire consisted of both closed and open-ended questions. To enhance the validity and reliability of the data collection tool, a 10% pre-test was undertaken involving randomly selected informants that would not constitute the main study. The study used a drop and pick strategy to distribute questionnaires. This approach was well suited for this study as it helped in improving the response rate. Secondary data was extracted from a five-year published company's records of farmers' payment statements. Data were cleaned, coded, processed, and analyzed using Statistical Package for Social Science (SPSS version 23). Inferential statistics viz. correlation and regression analysis were applied to determine how supplier training impacted the performance of sugarcane enterprises in Kenya.

V. Results

a) Demographic Supplier training

The respondents in the study consisted of both male and female farmers that supply all the established sugar factories in Kenya. The results in Table 2 show that sugarcane farming is dominated by male (63.5%) and women at (36.5%). The findings validate those of Dubb (2014) who established that sugarcane faming is labour intensive, thus male account for majority of farmers in South African Umfolozi region.

Table 2: Composition of Farmers (Respondents)

	Frequency	Percent	Cumulative Percent
Male	186	63.5	63.5
Female	107	36.5	100.0
Total	293	100.0	

b) Descriptive Statistics

The study sought to establish the extent to which millers provide supplier training among the sugarcane farmers. Table 3 shows that most of the respondents (42.8%) indicated that training on fertilizer application was to a less extent, 30.7% of the respondents showed that training on fertilizer application was to a moderate extent and 14.5% to a no extent at all. This implied sugarcane millers never attached any significant importance to fertilizer application on sugarcane, yet fertilizer has a substantial bearing on sugarcane productivity. On the other hand, farmers prioritized fertilizer application in the right quantities as having a positive impact on farm sugarcane production. The finding is in line with that of Zulu *et al*., (2019) in the study of factors affecting small-scale growers in Ndwende in South Africa found that the correct amount of fertilizer application had a significant increase on sugarcane production.

The capacity of the trainers to deliver the required knowledge to farmers on sugarcane farming was rated less extent, moderate extent, and large extent by 37.1%, 29.2%, and 17.2% of the respondents. Requisite technical know-how in sugarcane crop husbandry can have a positive impact on sugarcane production. The extent of training to farmers on land preparation was rated as to a moderate extent, to a less extent, and a large by 36.9%, 28.6%, and 16.9 % of the respondents. Training on cane planting was rated by 30% 0f the respondents as to a moderate extent an indication of the importance of prior preparation cane planting commences. Sugarcane production requires technical knowledge by the grower due to the many operations involved. The findings agree with the report of the South African Cane Growers Association (2011) that indicated the grower's labour must be resourced in technical know-how to produce a quality crop.

Training on weed and pest control was rated by (41.1%) of the respondents as to less extent. Weed and pest control can have a significant impact on crop yield. The use of either manual or chemical application should follow a planned schedule to ensure that weeds and pests do not affect crop production. The findings agree with those of (Owino *et al*., 2018; Hussain and Khattak, 2008) established that weed and pest control is a substantial overhead cost of sugarcane productivity in Kenya and South Africa. The results on training on intercropping also show that (32.9%) of the respondents indicated that the training was done to a moderate extent, while on the overall assessment of the extent to which farmers had received training on sugarcane farming, 29.4% of the respondents indicated that it was to a less extent and 28.7% indicated that it was to a moderate extent. The results imply that training on

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various aspects such as fertilizer application, land preparation, cane planting, weed, and pest control, and methods of cropping was not very effective. The findings are supported by Cockburn *et al*., (2014) that concluded the high cost of inputs and weed control are the major constraints of sugarcane production. Training through revamped extension services is considered an important input through which smallholder farmers could be motivated to improve cane yield and profitability.

Table 3: Descriptive Results on Supplier Trainings

Supplier Training Indicators	Not at all	Less extent	Moderate extent	Large extent	Very large extent	Mean	Median	Skewness
Extent to which training on fertilizer application has been done to farmers	14.5%	42.8%	30.7%	9.5%	2.5%	2.4	2	0.5
Extent to which trainers had capacity to deliver the required knowledge on sugar cane farming	13.4%	37.1%	29.2%	17.2%	3.1%	2.6	2	0.3
Extent to which farmers have been trained on land preparation	13.8%	28.6%	36.9%	16.9%	3.8%	2.7	3	0.1
Extent to which the farmers have received training on cane planting	16.2%	26.6%	30.0%	17.9%	9.3%	2.8	3	0.2
Extent to which farmers have received training on weeding and pest control	23.0%	41.1%	18.8%	13.1%	3.9%	2.3	2	0.6
Extent to which farmers have received training on intercropping in their cane farms	23.6%	31.8%	32.9%	10.4%	1.4%	2.3	2	0.3
Extent to which farmers receive trainings	21.5%	29.4%	28.7%	17.9%	2.5%	2.5	2	0.2

c) *Inferential Statistics*

i. *Hypothesis Testing using Correlation*

The objective of the study was to assess the impact of supplier training on the performance of sugarcane enterprises in Kenya. The research hypothesis to test the objective was stated in the alternative as Ha1: There is a significant positive relationship between supplier training and performance of sugarcane enterprises in Kenya. The Pearson correlation coefficient tested the strength of the relationship between the independent variable and the dependent variable. The results in Table 4 show a positive correlation of r= 0.347, p=000, which was significant at a 95% level of confidence. This result demonstrates that there is a positive association between supplier (farmer) training on all aspects of crop husbandry and the performance of sugarcane enterprises. It implies that as the level of farmer training increases, the level of performance of sugarcane enterprises also increases, resulting in improved farm sugarcane yield. The improved sugarcane yield supports the miller's operations and increases profitability for both the farmer and the miller.

Table 4: Correlation between Supplier training and performance of sugarcane

Variables	Supplier Training	Performance
Supplier Training	1.00	
Performance	0.347*	1.00

*** p<0.01, * p<0.05*

d) *Simple Linear regression Tests*

i. *Relationship between Supplier Training and performance of sugarcane*

The objective of the study was to assess the impact of supplier training on the performance of sugarcane enterprises in Kenya. A simple linear regression test was run to assess the effect of supplier training on the performance of sugarcane enterprises. The results in table 5 show an R-value of .347, an indication that supplier training and performance of sugarcane enterprises were positively correlated. The R square value was 0.121. The result implied that the supplier (farmer) training accounted for 12.1% of the variation in the performance of sugarcane enterprises. The balance of 87.9% could be accounted for by other variables introduced in the model. Therefore the study concluded that the model was adequately explaining the relationship.

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Table 5: Model Fitness Summary-Supplier Training

Indicator	Coefficient
R	.347
R Square	.121
Adjusted R square	.118
Std. Error of estimate	.46385

Table 6 shows the ANOVA results. The results show an F statistic of (1,285) =39.096, ($p<0.05$). The result demonstrates that the independent variable in the model had a significant effect on the dependent variable. Statistically, the results imply that the independent variable was a good predictor of the performance of sugarcane enterprise. The result returned an F value of 39.096 and $p=0.000$, which was less than 0.05. The results demonstrate that the training of farmers was statistically significant in the improvement of sugarcane production. The more the millers supported farmers through the more the increased sugarcane yields, and the opposite is also true.

Table 6: Analysis of Variance -Supplier Training

	Sum of squares	df	Mean squares	F	Sig
Regression	8.412	1	8.412	39.096	.000
Residual	61.319	285	.215		
Total	69.731	286			

The coefficient test results in table 7 show that a change in supplier training by one unit increased the performance of sugarcane enterprises by 0.203units. The change was positive implying that an increase in the training positively contributed towards the improvement in the performance of sugarcane enterprises. The constant was significant ($p<0.05$) and t-values were found to be positive and higher than the stated 1.96, and calculated as 27.822 and 6.253 respectively, thus indicating that when all other variables were controlled in the model, the level of sugarcane production would be 2.415 units. The findings are consistent with those of Joshi *et al*., (2017) which found that supplier training and Education resulted in improved performance of suppliers and buyers

Table 7: Regression Coefficients-Supplier Training

	Unstandardized Coefficient		Standardized Coefficient	t	Sig
	B	Std. Error	Beta		
(Constant)	2.415	.087		27.822	.000
Supplier Training	.203	.033	.347	6.253	.000

VI. Discussion of the Findings

The objective of the study was to determine whether supplier training enhances the performance of sugarcane enterprises in Kenya. The study found to support that there was a significant positive correlation between supplier training and performance of sugarcane enterprises in Kenya; hence, the hypothesis found support. The result demonstrates that when training of farmers in modern sugarcane farming is enhanced, it would result in improved sugarcane yield which would minimize the perennial shortage of raw material often experienced in the industry. The findings are supported by that of Njoroge & Mwangangi (2018) who concluded that supplier training in aspects like quality, production and management was responsible for improved procurement performance in Kenyan public universitie.

Training of farmers should be well structured with specific consideration of the target group and the interests of the miller. The action is informed by the understanding that developing a supplier in an industry where buyers are competing for the same supplier that produces the same product is difficult to achieve with certainty. Important issues like the level of education, age, the capacity of trainers, the content of the subject, and the method of delivery should be considered. The miller should put more effort into the selection of farmers to be developed and consider signing a contract with the farmer. This is intended to avoid the possibilities of a miller spending so much on training the farmer and later the farmer ends up selling the crop to another miller, resulting in the sugarcane poaching scenario currently being experienced in Kenya. Lawson *et al*., (2015) opined that buyer supported training programs that are well planned and extended to suppliers help suppliers in attaining capabilities that can increase the performance of suppliers and improve overall firm performance.

The Pearson correlation test R-347 found a significant positive relationship between the training and

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performance of sugarcane enterprises. The level of the relationship though positive, was not very strong. The result attests to the fact that if the training were increased, the corresponding performance of cane farming would be significant. However, there has been a decline in sugarcane yield per acre. However, there has been a decline in sugarcane yield per acre over the years. This aspect can be explained based on contextual and structural issues in sugarcane farming, drawing on the concept of technical efficiencies and the law of diminishing returns.

The analysis of the response rate shows that majority of the farmers, 64.4% are private; 48.1% have been farmers for a period of between 5-10years and 30.7% have been farmers for more that10years. This is an indication that 78.8% of the farmers have been in the trade for a long time and must have received some training on sugarcane farming during that period. Obviously; some farmers may have developed apathy towards training as they feel that they have been growing cane for a longer period and therefore they do not need further training. The training content, and delivery methods and the prevailing conditions in the sugarcane subsector may have contributed to the results (Mati & Thomas, 2018). Training is a long term investment, and therefore, the results of training may not be felt in the short term. Sugarcane farming requires a lot of farm inputs and considering that the majority of the farmers are private; they may not afford to invest adequately in inputs to support sugarcane production. The use of the correct fertilizer input combination and cost has a significant influence on sugarcane production (Owino *et al*., (2018).

Land tenure policy in Kenya allows subdivision of land into smaller parcels that are uneconomical to carry out meaningful farming. The continued subdivision of land into smaller plots results in many diseconomies that affect technical efficiencies. The continued use of ammonia and urea-based fertilizers has made the land to be acidic. Without adequate liming, the soils remain acidic and unproductive; the periodic application of agricultural lime becomes necessary. Amolo *et al*., (2017) established that soils in the western Kenya sugar belt were acidic and was one of the major factors responsible for the decline in sugarcane yield in the area. Similarly, it is not clear if the correct type of fertilizer, in the specified quantity, is applied at the scheduled time during the correct crop period. The majority of seed cane planted consists of varieties that are of reduced yield since there has been a slow adoption of new seed cane varieties that possess improved yield attributes (Thuo *et al*., 2019).

Sugarcane has two types of crop period, the plant crop is the first crop; after the first harvest, and the next crop is the ratoon crop. Owing to the high prices of seed cane, most farmers opt to continue to cultivate the ratoon crop. In most cases, the ratoon crop has an inverse relationship with crop yields, and the prevailing on-farm stock of sugarcane in the country consists of ratoon crops (AFA, 2015).In aggregate, it can be inferred that these factors result in allocative inefficiency in sugarcane and other agricultural production that affect overall farm yield as opined by (Mulwa & Emrouznejad, 2013).

VII. Conclusion

The study accessed the effect of supplier training on the performance of sugarcane enterprises in Kenya. The research hypothesis was supported based on the linear regression results that showed that supplier training had a positive influence on the performance of sugarcane enterprises in Kenya. The result confirms the view that buyer investment through the direct supplier development aspect of supplier training improves supplier capabilities that translates to improved performance of the buyer and supplier. The study, therefore, concluded that supplier training significantly contributes positively to improved performance of sugarcane enterprises in Kenya. Consequently, sugarcane millers should strive to train farmers in modern innovative methods to improve sugarcane yield and help to stem the recurring shortage in the country. This study validates similar results in other areas of the manufacturing sector in Kenya, specifically those concerned with the processing of agricultural-based raw materials that require a long gestation period as opposed to manufactured raw material. The study also provided the much-needed reference resource for similar future research spanning the less unexplored area of agricultural raw materials in Kenya.

Previous studies have mostly approached supplier development as a strategic sourcing strategy particularly concerned with the seamless inflow of manufactured raw material resources to support buyer operational needs. Few studies if any have been devoted to exploring agricultural raw materials aspects of supplier development, yet this is key to supporting the sugarcane manufacturing sector and the economy as a whole. This study contributes to the supply chain research stream of a supplier development initiative in the form of supplier training. This is an investment by the buyer but is also considered one aspect of resource seeking by the buyer to support its uninterrupted manufacturing process. Supplier training is a direct supplier development initiative that seeks to empower the supplier through the efforts of the buyer forming the wider resource exchange between the buyer and the supplier and is premised on the human capital theory. The found support for the hypothesis as there was a significant positive correlation between supplier training and sugarcane enterprises in Kenya. This provides support for human capital theory through direct supplier

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development that training of farmers imparts knowledge, skills, and capabilities in the trainee. The study found that supplier training improves the performance of sugarcane enterprise performance in Kenya. The finding is supported by Overstree *et al*., (2019) who opined that supplier training can enable the buying firm to gain a competitive advantage.

To improve the training of sugarcane farmers on the practical aspects of cane farming the study recommends that each miller establish a demonstration plot to enhance the ability and capacity to deliver on training. The study also recommends that millers should develop a comprehensive policy to govern their engagement with the farmers. Such a policy should have a provision of entering into a contract with farmers to facilitate seamless engagement and minimize cane poaching. The study further recommends that millers together with other stakeholders should strive to address the issues of technical inefficiencies in sugarcane production both in the short and long term. This is likely to provide insights into the underlying dynamics affecting sugarcane production in Kenya. Further studies are recommended to explore areas where sugarcane is grown under the contract regime as compared to sugarcane grown under the liberalized settings to provide empirical evidence on the constraints arising from the technical allocative inefficiencies that embed full exploitation of supplier development strategy in sugarcane farming in Kenya.

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