

Value chain, productivity and trade performance in the dairy industry

Value chain,
productivity in
dairy industry

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Abstract

Purpose – The purpose of this paper was to establish the contribution of value chain and productivity to trade performance in the dairy industry using evidence from Uganda.

Design/methodology/approach – This study research design is cross-sectional and correlational. Data were collected through a questionnaire survey of 108 dairy farmers, processors and exporters. Data were analysed through correlation coefficients and linear regression using Statistical Package for Social Sciences.

Findings – Hierarchical regression results indicate that value chain and productivity contribute significantly to variances in trade performance of dairy products. Therefore, appropriate value chain processes and high levels of productivity lead to increased trade performance in the dairy industry.

Research limitations/implications – This study focusses on trade performance of dairy products in Uganda. These research findings are useful for informing the deliberations of academicians, regulators and the business community. The results are applicable to all countries that carry out trade specifically in dairy products.

Practical implications – The results are important for trade policy development in the dairy industry. For example, this study informs farmers, processors and exporters of dairy products how value chain activities in dairy farming can be re-aligned to achieve better quality and productivity for exportation. Similarly, the current study provides policy guidance for the relevant ministries such as ministry of trade and other players to come up with holistic policy actions aimed at improving the trade performance of dairy products in the country.

Originality/value – To the researchers' knowledge, this is the first study that provides an initial empirical evidence on the contribution of value chain and productivity on trade performance of dairy products in Uganda.

Keywords Trade performance, Value chain, Productivity, Dairy products, Uganda

Paper type Research paper

1. Introduction

Trade performance is a major concern for both developed and developing countries since trade has been known as an engine for growth for quite a long time (Gnangnon, 2019; Omojimitte and Akpokodje, 2010). According to Kabir *et al.* (2018) and Yan (2017), trade performance is a mechanism used to evaluate a trader's return and risk tolerance in the exchange of goods or services between people or countries, often with money as a medium of exchange. Indeed, the level of a country's trading performance is a target for its trade policy formulation and implementation (Kabir *et al.*, 2018; Daniels, 1993). However, developed countries are continuously dominating world trade as most developing countries are always

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importing goods and services from developed countries such as United Kingdom, USA, the European Union countries and other countries in the Far East (Gnangnon, 2019). It should be noted that trade statistics showing a rapid expansion of technology-intensive, high value-added exports from developing countries are misleading, because of double counting of trade among countries linked through International Production Networks (Dapiran and Kam, 2017; Akyüz, 2003). Surprisingly such products are taken as exports from developing countries when in reality, developing countries are only involved in the assembly stages of production using technology-intensive parts and components imported from more advanced countries such as United Kingdom, Germany, among others (Dapiran and Kam, 2017). As trade flows are measured in gross value rather than value-added, imported parts and components are counted among the exports of the countries assembling them (Mutebi *et al.*, 2018; Akyüz, 2003). Although developing countries are seen to be major players in world markets for supply-dynamic and high-tech products, they still account for only 10% of world exports of products which score high in research and development content, technological complexity and/or economies of scale (Akyüz, 2003). Therefore, developing countries such as those in Africa are faced with a weak export performance (Bıçakcıoğlu-Peynirci *et al.*, 2019; Freinkman *et al.*, 2004), and this has an impact on its balance of payments given that exports are always less than the imports.

According to Abdallah (2019), Uganda's annual export earnings from the dairy sector is approximately US\$ 100m. However, the earning potential from Uganda's dairy products could increase to US\$ 500m annually if the country successfully affords to control the high death rates in exotic livestock, attributable to tick-borne diseases, and resistance of the ticks to available acaricide. This clearly shows the need to re-align and improve the dairy products value chain processes and increase productivity to attain higher trade performance in the industry. Notwithstanding, the trading performance of other related exports is also being affected by value chain and productivity challenges in Uganda. Indeed, as a whole, Uganda currently has total exports of 3,087,363.58 in thousands of US\$ and total imports of 6,729,436.50 in thousands of US\$ leading to a negative trade balance of 3,642,072.92 in thousands of US\$. But the trade growth is 16.83% compared to a world growth of 3.50% (World Integrated Trade Solution, 2020). Although Uganda's trade performance continues to improve over time, most commodities are exported in their raw form (Abdallah, 2019). The Uganda Export Promotion Board in 2013 opted to promote diversification of her exports by adding value to locally produced dairy products in order to enhance trade performance. But, Rauschendorfer and Spray (2018) note that, Uganda's export base has remained undiversified and dominated by a small number of raw commodities, and this is because the performance of the manufacturing sector has stagnated for most of the previous century. For example, in the recent past, Uganda has concentrated majorly on exporting non-processed agricultural products such as coffee and tea to the world market in addition to the unprocessed minerals. Nevertheless, by 2018, coffee earnings had already started falling, indeed in August 2018; coffee earnings fell by 24.2% following a drop in both its volume and the international coffee prices (Bıçakcıoğlu-Peynirci *et al.*, 2019). As such, Uganda's drive to diversify exports through dairy products is vital in improving its trade performance. Therefore, the unanswered question of how to improve Uganda's trade performance is an issue this research intends to answer through examining the contribution of value chain re-alignment and increased productivity in the dairy industry.

Empirical studies suggest several explanations to trade performance and these include: comparative advantage (Mahajan *et al.*, 2015; Abbas and Waheed, 2017), standards (Swam *et al.*, 1996), innovation (Greenhalgh, 1990) and exchange rate reforms (Omojimito and Akpokodje, 2010). While carrying out their study in the Indian pharmaceutical industry, Mahajan *et al.* (2015) concluded that comparative advantage has a positive effect on trade performance, and this implies that if Uganda has milk products it can process and export,

then it is likely to improve its trade performance. Further, [Abbas and Waheed \(2017\)](#) note that comparative advantage is a determinant for trade performance of Pakistan. As there exists minimal studies on trade performance, the existing few empirical studies call for further research on the topic (see [Abbas and Waheed, 2017](#); Daniels, 1992). To the researchers' knowledge, available studies on trade performance have even used evidence obtained from other countries other than African countries such as Uganda. Also, no study has attempted to employ value chain and productivity as possible explanations of trade performance using evidence from a developing agrarian economy such as Uganda. Yet, according to [Kataike et al. \(2019\)](#), value chain systems are critical in ensuring increased value addition to the final products in order to achieve international acceptance. Similarly, productivity which is the ratio of output to inputs is paramount in ensuring that the level of a country's production meets the available demand of its products ([Bakhtiar et al., 2018](#)). Moreover, Sharma (2015) states that productivity is used to compare performance between firms over time. Indeed, productivity growth without an increase in inputs is the best kind of growth aimed for rather than attaining a certain level of output by increasing inputs, since these inputs are subject to diminishing marginal returns which expressed efficiency in production ([Koebel et al., 2016](#)). By enlisting responses from 138 farmers, processors and exporters, we find that value chain and productivity are significant predictors of trade performance of dairy products in Uganda.

The present study results are important in a number of ways. The study adds on the already scant existing literature on trade performance by providing initial empirical evidence on the contribution of value chain and productivity to trade performance using evidence from an African developing country (Uganda). In terms of policy formulation on trade, this study is critical for government to come up with holistic policy actions aimed at improving the trade performance of the country through the promotion of increased production and processing of quality dairy products.

The rest of this paper is organized as follows. The next section is study setting, and this is followed by literature review and hypotheses development. Next is the methodology section which is then followed by results. The discussion section then follows and finally, summary and conclusion are provided.

2. Literature review and hypothesis development

2.1 Theoretical foundation

According to the new trade theory by [Krugman \(1989\)](#), in order to maximize the benefits from international trade and increase trade performance, return to scale in production should be increased. This will increase competitive equilibrium and productivity since the resulting economies of scale are internal to the firm and these internal economies of scale will position the firm to influence the market by controlling price and market share which spreads to the economy as a whole. Since the Second World War, economists took a deep study to ascertain whether a country should build its export and import base or whether it should focus on one in order to increase trade performance and economic growth. In many developing countries after 1988 through adoption of value chain and introduction of innovative ways to create quality, these countries began to show favourable trade performances informed of trade surpluses where exports exceed imports. ([Semancikova, 2016](#)). According to [WTO \(2013\)](#), free trade improves trade performance since more resources are utilized to produce more commodities for export, investment increases leading to growth in technology and incomes. [Kabir et al. \(2018\)](#) and International Trade Centre (2007) show that trade performance is characterized by rough indicators, such as the level of openness (total trade in goods and services divided by GDP) or growth of exports over a given period. As such the increment of exports and imports of a country over time on the world market with exports exceeding imports in terms of volume and quality is paramount. Studies show that globalization has

become an important topic to many state leaders because with globalization comes increase in trade and trade performance as well as a reduction in tariffs. This leads to increase in growth, reduction in poverty and inequality.

2.2 Value chain and trade performance

According to [Dapiran and Kam \(2017\)](#), value chain refers to the process or activities by which an entity adds value to a product or service, including production, marketing and the provision of after-sales service. Also, value chain entails a set of activities that a firm operating in a specific industry performs in order to deliver a valuable product for the market (João and Sónia 2014; [Swinnen and Maertens, 2007](#)). Balikowa (2011) indicates that the dairy value chain involves activities such as milk production, collection, bulking and transportation, processing, distribution and marketing which jointly transform raw milk into valuable products such as ice cream, butter, cheese, among others. In light of the aforementioned, international trade is increasingly appreciating value chains. Indeed, the emphasis is currently on the value of the services, raw materials, parts, components and final products exchange across countries. To that end, participation in value chain has also been increasing, thus presenting new prospects for growth. According to [Dapiran and Kam \(2017\)](#) and OECD (2013), economies are presently participating in value chain by using imported inputs in their exports (the so-called backward linkages in value chain) or by supplying intermediates to third-country exports (forward linkages). This shows that the overall participation in value chain (measured as the sum of backward and forward linkages) differs substantially across countries, with larger economies relying less on international trade and small open economies more integrated into value chains ([Nickerson et al., 2007](#)). The overall participation in value chain (measured as the sum of backward and forward linkages) has increased for every OECD member country since 1995, despite the recent slowdown that followed the economic crisis ([OECD and WTO, 2015](#)). Value chains also act as the paradigm for the international organization of production since nowadays, most processes of production of goods and services are produced in separate stages located in different countries and assembled either sequentially along the supply chain or in a final location. As a matter of fact, the rise of these value chains, interlinked with the strong expansion of international trade, especially of parts, components and foreign direct investment flows, mostly by multinational corporations are the key players in the operation of world networks and have produced a deep and lasting impact on the world economy. This has affected competitiveness, macroeconomic developments and strongly increased the economic interdependence between countries (João and Sónia, 2014).

There are minimal studies that link value chain to trade performance. However, few studies attempt to argue that value chain is linked to trade performance, for example, [Dapiran and Kam \(2017\)](#); [Kaplinsky and Morris \(2000\)](#) put it that the value chain describes the full range of activities which are required to bring a product or service from conception, through different stages of production, delivery to enterprises' export performance final consumers and final disposal after use. Different stages along the value chain are associated with value-added components, measured as total industrial output minus materials used and labour costs in the production process and regarded as an indicator of the level of profitability and/or efficiency ([Yi et al., 2012](#)). It is important that an analysis of the stages of a product is done as this has an effect on the quality of the product. For example, the stages through which milk is processed up to the final stage need to be analysed frequently in order to have quality milk from Uganda on the world market. Value chain analysis according to [Porter \(1985\)](#) has been mostly used for manufacturing industries to maximize value through an evaluation of production and distribution chains, with particular emphasis on delivery time and quality commensurate with price ([Maaja and Kulno, 2009](#)). Value chain of any

given product should be given attention in order to have better products at the world market. Recent evidence from sub-Saharan African countries suggests that while hospitality industries are experiencing significant growth, value (such as return on investment) is not being created efficiently due to firm-specific or external influences (Kataike *et al.*, 2019; Sharma and Christie, 2010). Whereas the aforementioned study was conducted in hospitality industries, it is likely that the results can be generalized to the dairy industry as well. Given that value chain is important for improving quality of the product as well as the delivery time and price, it is likely that in an organization or country where value chain is emphasized, there will be improved trade performance. Similarly, if the dairy industry in Uganda emphasizes value chain in the processing of milk, then the world market is likely to be attracted to such milk and this will automatically lead to better trade performance. Therefore, we hypothesize that:

H1. There is a significant positive relationship between value chain and trade performance in Uganda.

2.3 Productivity and trade performance

According to Sharma (2015), productivity has been used to compare performance between firms over time. For example, productivity growth without an increase in inputs is the best kind of growth aimed for rather than attaining a certain level of output by increasing inputs, since these inputs are subject to diminishing marginal returns which expressed efficiency in production (Topalova and Khandelwal, 2011; Winkler, 2010). Administrative procedures and public policy play a crucial part in influencing productivity and the considerable variance in productivity growth across states is attributed to regional differences in infrastructural facilities which showed that infrastructure is a key factor to productivity (Kumar, 2006; Babu and Natarajan, 2013). Even with the increased global integration in developing countries, productivity levels between different sectors as well as between firms within a sector are seen to have large gaps which indicated inefficiencies in resource allocation and wastage (Schwörer, 2013). So, in order to improve the overall productivity in the economy, the resources and workforce from activities are moved from low productivity to activities with higher productivity (Bakhtiar *et al.*, 2018). In addition, enterprises that operated at the optimum scale and generated maximum value achieved the best productivity from costly and scarce resources by designing policies that promoted the most productive scale of operations for growth in the manufacturing sector and other sectors in the economy (Dhwani and Seema, 2015). Also, government policies that promote productivity gains are directed on sources of productivity that perform poorly and needed policy support (Sharma, 2015).

Studies that link productivity to trade performance are rare. Studies such as Koebela *et al.* (2016); Melitz and Ottaviano (2008) have treated productivity as a dependent variable. The authors found trade increases aggregate productivity by forcing the least productive firms to exit. In another study conducted by Bakhtiar *et al.* (2018), productivity was treated as a dependent variable while the independent variables were research and development investments and export. However, there are studies where productivity has been used as an independent variable (see Cui *et al.*, 2015). Cui *et al.* (2015) suggest that facility productivity is negatively associated with air emission intensity. Further, Cui *et al.* (2015) found that exporting facilities have significantly lower emissions per value of sales than non-exporting facilities in the same industry. Hence, according to Koebel *et al.*, 2016, productivity is correlated with the level of exports. As a result, it can be argued that productivity is likely to lead to improved trade performance. Therefore, we hypothesize that:

H2. Productivity is positively and significantly related to trade performance.

3. Methodology

3.1 Study setting

This study gathered data from dairy farmers, processors and exporters in Uganda. Uganda is a land-locked country with a population of 41.49m according to World Bank (2016). It is also predominantly an agrarian economy where 72% of Uganda's population is employed in agriculture (UBOS 2016). Uganda's agricultural sector is majorly comprised of crop husbandry and livestock farming. According to Kataike *et al.* (2018) and Uganda Export Promotion Board (2013), the government of Uganda, in an attempt to promote diversification in its trade pattern, emphasized value addition to dairy products in order to enhance trade performance of the country. Uganda's dairy industry has bucked a trend in the agricultural sector in which production grew very slowly since the late 1990s and was less than 1% in 2010/2011. However, milk production grew quite rapidly at about 7% annually since then, and the number of livestock also increased. Whereas in the early 1990s, Uganda was dependent upon imported milk powder, it is now largely self-sufficient in fresh milk. Livestock and dairy products were some of the new products that the government of Uganda promoted for export as a way to diversify and increase trade performance which increased productivity throughout the value chain. In Uganda, dairy farming is regulated by the Dairy Development Authority (DDA) formed under the Dairy Industry Act of 1998. DDA started its operations in 2000 (FBAM, 2014). Regardless, the dairy industry in Uganda faces a number of constraints. First, the dairy keepers are not keepers of animals for business but are part of their culture and lifestyles. The second relates to high milk spoilage and poor-quality milk because of lack of cooling facilities and high electricity costs to keep the milk in cold conditions. Kataike *et al.* (2018) and Uganda Export Promotion Board (2014) make conservative estimates of about 80% of the milk produced to be sold through informal market channels mainly by small-scale farmers owning over 90% of the cattle population of country. According to Kataike *et al.* (2018) and DDA (2010), the milk industry in Uganda is highly skewed comprising 1m smallholders, 10,000 of middlemen with least agents in the milk supply chain being processors and exporters. It is thus a worthwhile endeavour to undertake a study of this nature in an emerging economy where agriculture is the backbone.

3.2 Design, population and sample

Cross-sectional and correlational research designs were used. Cross-sectional research design is a type of observational study that analyses data collected from a population, or a representative subset, at a specific point in time (Saunders, 2009; Sekaran, 2003). This research design is now gaining considerable attention for similar studies (see Yan, 2017; Gnangnon, 2019). In this study, we intended to collect data within a short period of time and thus the appropriate design was a cross section. We also employed a correlational study because we wanted to establish relationships among study variables. The study population constituted of various individuals in the dairy sector in Western Uganda including farmers, processors and exporters. According to Mbarara Dairy Farmers Association (2017), there are 213 farmers, 3 exporters and 3 processors. Following the Krejcie and Morgan table of 1970 of sample size determination, we selected a sample of 136 farmers (simple random sampling) and also included all exporters and processors. We received 108 useable questionnaires. Of the 108 useable questionnaires, 81 (or about 75%) were from male respondents while 27 (or about 25%) were female respondents. Majority of the respondents were aged between 36 and 45 years whereby 51% were aged between 36 and 45 years, those aged 47.2 years and above were 22.2%, 26.9% were aged between 26 and 35 years and the remaining were aged 18–25 years. In terms of education background, majority of the respondents had only secondary education – ordinary level (42.6%), and these are followed by those who completed primary education (29.6%). Those who went to school but never completed primary seven were only

2 respondents (about 1.9%) while those who completed tertiary education were 3.7%. The aforementioned information is summarized in [Table 1](#).

3.3 The questionnaire and variables measurement

This study's data collection instrument involved the researcher preparing a set of questions pertaining to the field of enquiry. The choice of a questionnaire was justified by the fact that it was the single best tool in collecting quantitative data from a big number of respondents (Amin, 2005). We designed our questionnaire on a five-point Likert scale ranging from strongly disagree (1) to neutral (3) to strongly agree (5). We used perceptions of farmers, processors and exporters given that the culture of information availability in Uganda is far from the desirable. Our questionnaire had only closed ended questions. We operationalized our variables as follows:

Trade performance which is our dependent variable was operationalized using the trade volumes which entailed comparing the amount of exports (dairy products) to imports (raw materials used in production), profitability by comparing revenue from the sale of dairy products and the cost of production. We also used the product varieties to measure trade performance by comparing how many products dealers in the dairy sector export and import ([Kabir et al., 2018](#); [Cattaneo et al., 2013](#)).

Value chain which is one of our independent variables was operationalized by looking at the value created at each stage of production, the intermediate commodities at these stages of production and how the stages were well coordinated ([Dapiran, and Kam, 2017](#); [Cattaneo et al., 2013](#); [João and Sónia, 2014](#)).

Productivity was our other independent variable which was operationalized by analysing the quality of the output used in production, the cost incurred while producing the dairy products, the innovation in this production and the income received from the sale of the dairy products ([Bakhtiar et al., 2018](#); [Kumar, 2006](#); [Babu and Natarajan, 2013](#)).

3.4 Validity, reliability and parametric tests

We assessed validity of the instrument using a content validity index. The instrument was given to three academicians and three practitioners. The overall content validity index was 0.78 which is acceptable ([Field, 2009](#)). [Field \(2009\)](#) explains validity as evidence that a study allows correct inferences about the question it was aimed to answer or that a test measures

Item	Frequency	Percent
Male	81	75.0
Female	27	25.0
Total	108	100.0
18–25 years	4	3.7
26–35 years	29	26.9
36–45 years	51	47.2
46 years and above	24	22.2
Total	108	100.0
None	2	1.9
Primary	32	29.6
Secondary (S.1–S.4)	46	42.6
Secondary (S.5–S.6)	24	22.2
Tertiary/institution	4	3.7
Total	108	100.0

Source(s): Primary data

Table 1.
Respondents' profile

what it is set out to measure and further explains content validity index as evidence that the content of a test corresponds to the content of the construct it was designed to cover. We further tested for reliability of the questionnaire using Cronbach α coefficient, and the Cronbach α values for value chain, productivity and trade performance are 0.759, 0.816 and 0.898 respectively. Cronbach (1951) requires a Cronbach α coefficient of at least 0.7 and above, and for this study, the instrument was reliable. Reliability is the ability of a measure to produce consistent results when the same entities are measured under different conditions (Field, 2009).

For parametric tests, we tested for normality, linearity and homogeneity. We carried out parametric tests because this study was correlational and thus intended to use Pearson correlation coefficient which requires data that is normally distributed. Normality can be assessed to some extent by obtaining skewness (symmetrical) and kurtosis (peakedness) values of each measured variable. According to Field (2009), skewness and kurtosis indicate the deviation from normality, whereas Tabachnick and Fidell (2001) suggest using a histogram to evaluate the shape of data distribution. Therefore, the bell-shaped histogram (Figure 1) confirms that data are normally distributed in the current study. Linearity refers to the presence of a straight-line relationship between two variables. As the regression analysis is only suitable for testing linear relationship between the independent variables and dependent variables, this assumption must be met before performing this analysis. Linear data is obtained when the scores are seen to be in the form of fairly straight line, not a curve. A normal probability plot (normal Q-Q plot) was used in this study to plot the residual against the predicted scores. Field (2000) noted that if the assumption of linearity between the independent variable and dependent variable is met, the plot of the residual against predicted scores will also be linear (Figure 2). Therefore, the normal plot results revealed a fairly straight line showing that the data was linear. Homogeneity test was conducted to assess the suitability of data for parametric tests. This assumption means that the variance of one variable should be stable at all levels of the other variable (Field, 2009). Graphically, a scatter plot was drawn plotting the residual against the dependent variable. The results of the scatter plot (Figure 3) showed that the points are dispersed around zero and there was no other clear trend in the distribution. This is an indication that homogeneity and linearity assumption were met. If the graph funnels out or if there is a curve in the graph, it indicates the probability of heteroscedasticity in the data which can violate the condition of multivariate analysis (Field, 2009), hence it is not the case for this study. Given the fact that the tests for parametric assumption were met, parametric tests were found suitable for the study.

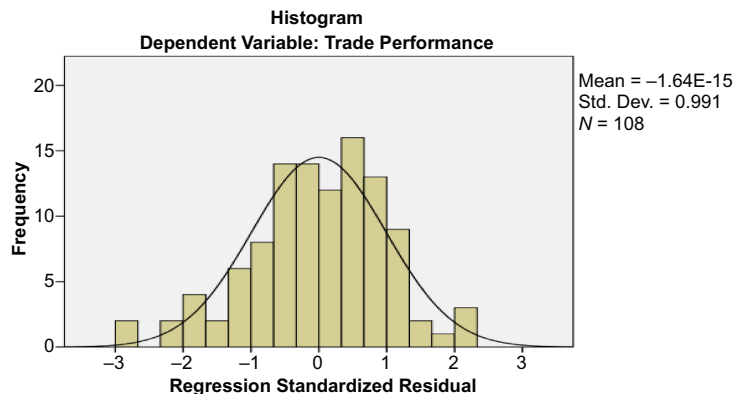
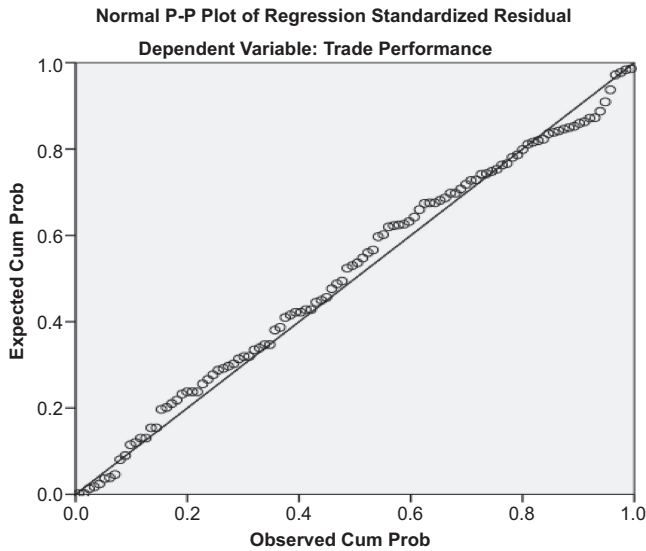


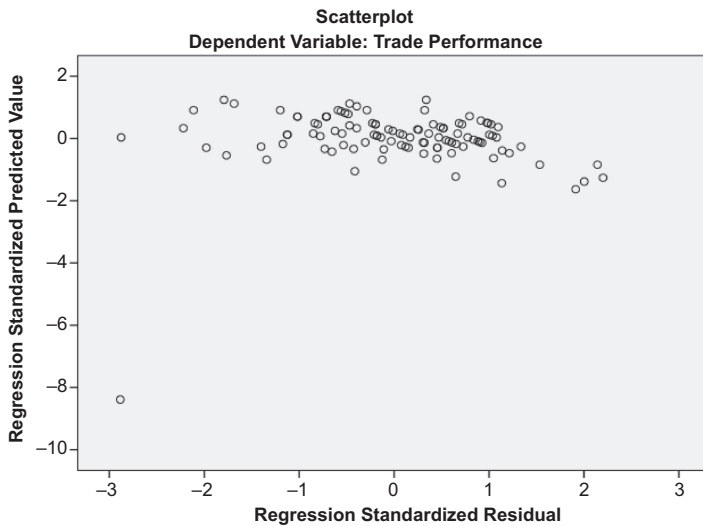
Figure 1.
Graphical presentation
of normality test –
Histogram

Source(s): Primary data



Source(s): Primary data

Figure 2.
Graphical presentation
of linearity test –
normal P-P plot



Source(s): Primary data

Figure 3.
Graphical presentation
of homogeneity test

4. Results

4.1 Descriptive statistics

We present summary descriptive statistics in [Table 2](#) for value chain, productivity and trade performance. We report the means and standard deviations since the calculated means represent the data while standard deviations show how well the means represent the data ([Field, 2009](#)). For this study, the means and standard deviations for productivity, value chain

and trade performance are 4.50 and 0.37, 4.52 and 0.38 and 4.52 and 0.36 respectively. Given that the standard deviations as compared to the mean values of the study variables are small, it implies that the means highly represent the data.

4.2 Correlation analysis

We used Pearson correlation coefficient to establish whether or not there are relationships between the study variables as hypothesized in literature review. From [Table 3](#) results, value chain is positively and significantly related to trade performance ($r = 0.491^{**}$, $p < 0.01$), this implies that a positive change in value chain brings about a positive change in trade performance. Results further indicate a positive significant relationship between productivity and trade performance ($r = 0.631^{**}$, $p < 0.01$), and this means that a positive change in productivity leads to a positive change in trade performance. Therefore, preliminarily, [H1](#) (*there is a significant positive relationship between value chain and trade performance*) and [H2](#) (*productivity is positively and significantly related to the trade performance*) are supported. In terms of control variables (number of years spent in dairy farming and type of dairy products), none of them is positively and significantly associated with trade performance, and thus our model is not affected by the confounding variables. We also examined correlations among our independent variables to determine whether multicollinearity problems exist. As [Table 3](#) shows, none of the correlations between independent variables is close to these threshold values of 0.80 or 0.90 as suggested by [Field \(2009\)](#). Therefore, our study did not suffer from multicollinearity problems.

4.3 Hierarchical regression analysis

A hierarchical regression analysis was conducted to establish the contribution of each independent variable in explaining factors influencing value chain on the trade performance of dairy products in Uganda for the case of western Uganda. Hierarchical regression analysis was used to determine the predictive power of the separate variables on the dependent variable as shown in [Table 4](#). The model specification was as:

Table 2.
Descriptive statistics of
the study variables

Variable	<i>n</i>	Min	Max	Mean	Std. Deviation
Trade performance	108	1.75	4.92	4.5293	0.36034
Value chain	108	1.86	5.00	4.5225	0.38529
Productivity	108	1.60	5.00	4.5033	0.37367
Duration in dairy processing	108	1.00	5.00	1.2991	0.68975
Product processing stages	108	1.00	3.00	2.1574	0.82215

Source(s): Primary data

Table 3.
Correlation analysis
results

Variable	1	2	3	4	5
Trade performance (1)	1				
Value chain (2)	0.491 ^{**}	1			
Productivity (3)	0.631 ^{**}	0.529 ^{**}	1		
Duration in dairy processing (4)	-0.128	0.054	-0.176	1	
Product processing stages (5)	0.168	-0.043	0.131	-0.257 ^{**}	1

Note(s): ^{**}Correlation is significant at the 0.01 level (two-tailed)
Source(s): Primary data

Item	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	4.624	0.117	2.504	0.359	1.359	0.373
Duration in dairy processing	-0.067	0.051	-0.086	0.044	-0.028	0.040
Product processing stages	-0.003	0.055	-0.027	0.047	-0.004	0.042
Value chain			0.482	0.078	0.224	0.082
Productivity					0.490	0.086
R^2		0.016		0.280		0.455
Adjusted R^2		-0.002		0.259		0.434
R^2 change		0.016		0.264		0.175
F change		0.871		37.750***		32.704***
Source(s):	Primary data					

Table 4.
Hierarchical regression
analysis

$$\text{Model 1: } TP = b_0 + b_1N + b_2S + \varepsilon$$

$$\text{Model 2: } TP = b_0 + b_1N + b_2T + b_3VC + \varepsilon$$

$$\text{Model 3: } TP = b_0 + b_1N + b_2T + b_3VC + b_4P + \varepsilon$$

Where:

TP = trade performance

b_0 = constant

b_1N = standardized beta coefficient (β) of the number of years spent in dairy farming

b_2T = standardized beta coefficient (β) of product processing stages

b_3VC = standardized beta coefficient (β) of value chain

b_4P = standardized beta coefficient (β) of productivity

ε = error term

Results of Model 1 in [Table 4](#) indicate that the control variables (number of years spent in dairy farming and type of dairy products) explain 1.6% variance in trade performance. Model 1 is the baseline model where only control variables were entered. The results indicate that control variables do not individually explain any significant variance in trade performance. That is, duration in dairy processing (standardized $\beta = -0.129$, $p > 0.05$) and product processing stages (standardized $\beta = -0.004$, $p > 0.05$). This reveals that the models in this study are not sensitive to confounding factors and the models are highly acceptable ([Field, 2009](#)). Model 2 shows that the addition of value chain to the equation accounts for an extra 26.4% of the variance explained by the model ($R^2 = 0.280$; $f\Delta = 37.750$; $p < 0.05$), and value chain is a significant predictor of trade performance, thus providing support for [H1](#). The addition of productivity in Model 3 indicates an extra 17.5% of variability in trade performance ($R^2 = 0.455$; $f\Delta = 32.704$, $p < 0.05$). The model results also show that there is a significant relationship between productivity and trade performance ($\beta = 0.508$; $p < 0.05$), thus providing support for [H2](#). Lastly, the variables entered in the regression model explained an overall of 43.4% (Adjusted $R^2 = 0.434$) of the variance in trade performance implying that the remaining 56.6% is explained by factors not considered in this study. Nonetheless, considering the two main predictors (value chain and productivity) in this study, the results show that productivity has a better contribution effect on trade performance of dairy products than value chain. Therefore, the study results support both [H1](#) and [H2](#). Generally, the results suggest that Model 3 in [Table 4](#) is the most plausible model. The incremental validity in adjusted R^2 in Models 1–3 suggests a better fitting model which develops as value chain and productivity are successively introduced ([Field, 2009](#)) because in all the cases but Model 1, the F change is significant.

5. Discussion

According to the present study results, the contribution of value chain and productivity to trade performance is such that both value chain and productivity are significant predictors of trade performance. It can further be noted that the wholesaler in the major two channels acts as a middle man since he can buy dairy products from the farmer or from milk retailer which he or she may choose to send to the processor or take to urban retailers and finally to the consumer. The findings obtained imply that any business person/government should be able to understand the quickest way to have these products

reach the final consumer. It should further be noted that this chain can be improved and value of milk can be added at farm level most especially in deep villages if government sets up rural industrial centres since this will improve on trade performance. According to the findings of this study, value chain is a significant predictor of trade performance. This therefore signifies that, when there is connected value chain, better intermediated products and good coordination of dairy products, trade performance will be improved. Economies can participate in value chain according to OECD (2013) by using imported inputs in their exports (the so-called backward linkages in value chain) or by supplying intermediates to third-country exports (forward linkages) showing that the overall participation in value chain (measured as the sum of backward and forward linkages) differs substantially across countries, with larger economies relying less on international trade and small open economies being more integrated into GVCs. The overall participation in value chain (measured as the sum of backward and forward linkages) has increased for every OECD member country since 1995, despite the recent slowdown following the economic crisis. This study's findings are in line with those of [Tinta \(2017\)](#) and [Kaplinsky and Morris \(2000\)](#), who put it that the value chain describes the full range of activities which are required to bring a product or service from conception, through different stages of production, delivery to enterprises' export performance final consumers and final disposal after use.

The results further revealed a significant positive relationship between productivity and trade performance. This implies that once quality inputs are used during processing and handling of dairy products and continued innovations are emphasized in processing and handling dairy products, it will lead to improved trade performance. These findings are in line with [Sharma \(2015\)](#) and [Crespi et al. \(2015\)](#), who argue that productivity is used to compare performance between firms over time, for example, productivity growth without an increase in inputs is the best kind of growth to aim for rather than attaining a certain level of output by increasing inputs, since these inputs are subject to diminishing marginal returns which will not be an expression efficiency in production. Administrative procedures and public policy play a crucial part in influencing productivity, and the considerable variance in productivity growth across states which can be attributed to regional differences in infrastructural facilities shows that infrastructure is a key factor to productivity ([Kumar, 2006](#); [Babu and Natarajan, 2013](#)).

6. Summary and conclusion

The purpose of this study was to establish the contribution of value chain and productivity to trade performance. This aim was achieved through a questionnaire survey of 108 respondents. Results suggest that both value chain and productivity are significant predictors of trade performance. The present study results are important to both academicians and practitioners. Whereas there had not been any empirical evidence on the contribution of value chain and productivity to trade performance, this study provides additional literature on the determinants of trade performance in an emerging economy such as Uganda. This study is also critical for government to come up with holistic policy actions aimed at improving the trade performance of the country through the promotion of production of dairy products. The dairy products traders/dealers may also improve their productivity and ensure that they increase productivity. Therefore, it is clear that for dairy industry managers to realize increased trade performance, they must re-align the dairy products supply chain. They should rear the right breeds of livestock and ensure proper management of the farms and livestock. Similarly, at the time of harvesting the milk, it should be properly collected, processed and the outputs (dairy products) should be well packaged and preserved in line with the international standards. Marketing and sales in overseas bigger

markets should also be emphasized. At the same time, it is imperative to gather customer feedback to keep improving the quality of dairy products. To facilitate these core dairy industry value chain primary activities are the facilitating factors such as proper procurement, transportation, accounting, finance and competent human resources in the dairy products business. Productivity in terms of increasing the quality of the output used in production of dairy products, minimizing the cost incurred while producing the dairy products, the innovation in this production and the income received from the sale of the dairy products should also be emphasized for increased dairy products trade performance in Uganda.

Like any other study, this study has a number of limitations which we discuss along with areas for future research. The study employs only value chain and productivity as major determinants of trade performance, but there could be other determinants of trade performance. Future studies may explore other determinants of trade performance in Uganda and in other national settings. The study only explores the agricultural sectors and ignores the other sectors. Future studies could consider other sectors as their sample. Trade performance is an area that up to date has been understudied especially in the developing nations, and for this case, future study may be undertaken to further add on the existing scant literature. Nonetheless, the study results are useful in informing policy and adding on the already existing scant literature.

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Value chain,
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