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**Article**

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## MARKETING | RESEARCH ARTICLE

# Effects of market orientation on farmer resilience and dairy farm performance in emerging economy

Dickson Otieno Okello<sup>1\*</sup> and Fahad Juma Luttah<sup>1</sup>

**Abstract:** The focal point of this study was determining the effect of market orientation on farm performance as moderated by farmer resilience in the volatile dairy sector of an emerging country, Kenya. Using data from 682 respondents found in one of the vibrant dairy production counties in the country, Murang'a County, the study examined the interrelationships between market orientation, farmer resilience, and farm performance. Results from the analysis indicate a significant relationship between all the dimensions of market orientation (competitor orientation, customer orientation and inter-functional coordination) with both farmer resilience and farm performance with the exception of a non-significant relationship between customer orientation and farm performance. The significant relationship between inter-functional coordination and farm performance was the only one that displayed a negative correlation. The findings on the moderating effects of resilience on the market orientation-farm performance relationship report a positive significant effect. As this study represents the first effort to look into the linkages between



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Dickson Otieno Okello is a lecturer in the Department of Agricultural Economics and Agribusiness Management, Egerton University - Kenya. He is also a social entrepreneur, founder Blended Ag-Powered Entrepreneurship (BAPE) which is a consultancy firm in agribusiness and business development for micro-small medium enterprises (MSMEs). He is a PhD candidate in Agribusiness Management, Egerton University, Kenya. His research areas include entrepreneurship and agribusiness management, agricultural value chain analysis, consumer behaviour and marketing in agribusiness.

### PUBLIC INTEREST STATEMENT

This paper examines the extent to which farmer resilience moderates the effect of market orientation on farm performance among smallholder dairy farmers in Kenya. Kenyan dairy farmers face an increasingly turbulent business environment and to cope they need to have resilient farming systems that have the capacity to better deal with the volatility of the sector. Therefore, it is paramount to understand how possession of resilience affects the relationship between farm performance and its determinants such as market orientation. The study findings show a significant relationship between all market orientation dimensions (competitor orientation, customer orientation, and inter-functional coordination) and farmer resilience and farm performance, with the exception of a non-significant relationship between customer orientation and farm performance. The only significant relationship with a negative correlation was that between inter-functional coordination and farm performance. The results of the study on the moderating effects of resilience on the market orientation-farm performance relationship show a significant positive effect.

the three concepts collectively, it provides important insight into the understanding the three concepts in the context of an emerging country.

**Subjects:** Rural Development; Economics and Development; Economics

**Keywords:** Dairy sector; farmer resilience; farm performance; market orientation

## 1. Introduction

The concept of market orientation (MO) in agriculture is a prevalent theme in the developing and transition economies' policy discussions and literature (Ayenew & Espinosa, 2016). MO is perceived as the organization culture that most effectively and most efficiently creates the necessary behaviors for creation of superior value for buyers and thus secure the continuous superior performance for the business (Narver & Slater, 1990). It is also considered as the organization-wide generation of market intelligence, dissemination of the intelligence across departments and organization-wide responsiveness to it (Kohli & Jaworski, 1990). In the last 30 years, the impact of MO on firm performance in the agricultural sector has been the focus of a considerable body of research (Asif et al., 2018; Ayenew & Espinosa, 2016; Dawit et al., 2017; Ho et al., 2017; IFAD, 2017; Jagdish et al., 2017). These analyses conclude that there is a positive relationship between MO and agricultural performance. However, despite these studies extensively covering the agricultural sector (Dias et al., 2018), the concept of MO has received limited attention in the field of dairy production especially the Kenyan dairy sector.

Kenya's dairy sector contributes about 8% of the country's Gross Domestic Product (GDP) with an annual milk production of 3.43 billion liters (Odero, 2017) and for every 1000 liters of milk produced, full-time employment for 77 people in milk production and 3–20 jobs in processing and marketing are created (Nyameasem et al., 2018). Despite the dairy sector's ability to not only promote economic growth in sub-Saharan Africa but to also secure economic development by providing an avenue for ensuring higher labor productivity, poverty alleviation, women empowerment and food security, performance in the sector remains low (Hill, 2017; Oloo, 2016). This poor performance is demonstrated by an analysis of milk yield data from 2006 to 2016 that showed a decrease of 8.1% that translates to an annual decreasing rate of 0.74% for Africa (FAOSTAT, 2018).

In addition to MO, farmer resilience is an indispensable farmer attribute that has the potential to ensure optimal farm performance in the ailing dairy sector (Evans & Wall, 2019). The possession of resilience by farmers is necessitated by the fact that dairy farmers face an increasingly turbulent business environment and to cope they need to have resilient farming systems that have the capacity to better deal with the volatility (Shadbolt & Olubode-Awosola, 2013). For instance, Kenyan farmers face challenges with regard to quality and unavailability of feeds during drought periods, controlling livestock diseases, sources of information, breeding services and accessing credit (Onono & Ochieng, 2018). However, despite there being sufficient documentation with respect to challenges in the dairy sector and their effects on production, minimal attention has been paid on the impact of market orientation on farm performance as mediated by farmer resilience.

Current literature fails to point out the linkage between MO and resilience despite having established a positive relationship between; MO and innovation (Mirzaei et al., 2016; Newman et al., 2016; Ocampo et al., 2018; Prifti & Alimehmeti, 2017) and between innovation and resilience (Andes, 2016; FAO, 2020; Harvey & Natasha, 2017). Furthermore, the linkages between MO, farmer resilience, and farm performance in the dairy sector are yet to be explored in sub-Saharan Africa. The purpose of this paper is to examine the interrelationships between MO, farmer resilience, and farm performance in the dairy sector.

## 2. Literature review

This section describes concept of market orientation, farmer resilience and farm performance, and their linkages as covered in the current body of literature.

### 2.1. Market orientation

Market orientation is an organizational culture that involves placing customer satisfaction at the center of the business' operations (Dawit et al., 2017). It delivers value for customers and results in better performance for organizations (Ozkaya et al., 2015). Kohli and Jaworski (1990) were the first practitioners who started investigating MO with three major components, namely, intelligence gathering, intelligence dissemination, and responsiveness to market intelligence in their research and defined MO as a firm implementing the marketing concept to achieve firm superior performance (Chee-Hua et al., 2013). Later, this topic was further examined by previous researchers, for example, Narver and Slater (1990). According to Narver and Slater (1990), MO consists of the concentration on customers and competitors, and integrating of firms' functions to create the superior value to customer.

This study adopts Narver and Slater's (1990) conceptualization of MO that has been applied in agribusiness studies (Ho et al., 2017), food industry (Aziz & Mohd Yasin, 2010; Ho et al., 2017; Johnson, 2009) and emerging countries. The concept includes customer orientation (CO), competitor orientation (CPO) and inter-functional coordination (IFC). Many previous studies indicated that those three dimensions provide a holistic picture of collecting, disseminating and using market information in firms (Narver & Slater, 1990).

According to Ho et al. (2017), CO requires a firm to understand the potential customer needs, satisfy customer's needs, and create value to them in a continuous basis for a sustainable competitive advantage. Ho et al. (2017) further stated that the adoption of CO requires firms to collect information about customers and act as an advantage to identify and satisfy customer's needs and wants through the application of customer data. CO is also recognized as a firms' co-creator for value creation that will further increase firm performance (Lewrick et al., 2011).

CPO is the ability to understand the competitor's short-term strengths and weaknesses and its long-term capabilities and strategies to generate competitive advantage in the organization. Chee-Hua et al. (2013) mentioned that the collaborative organizational culture enables firms to improve competitive performance. IFC is the coordinated efforts of an organization's resources in creating superior value to customers (Narver & Slater, 1990) and to generate the cooperation among all departments in the organizations to create superior value for customers. IFC can also be noted as different departments or functions in an organization cooperating to work together to achieve certain objectives (Ho et al., 2017).

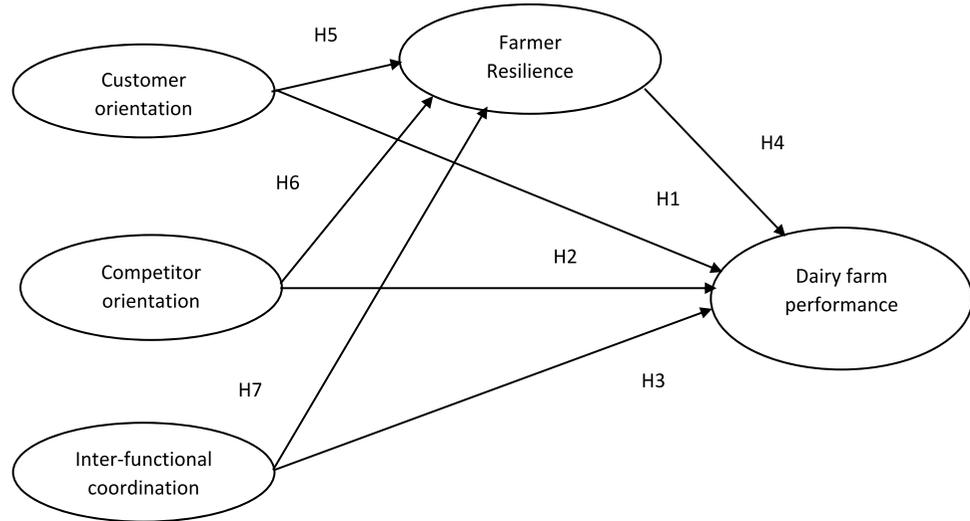
Substantial research on the impact of MO on agricultural performance presents a positive relationship between the two constructs (Šályová et al., 2015; Ayenew & Espinosa, 2016; Dawit et al., 2017; Ho et al., 2017; IFAD, 2017; Micheels & Gow, 2011; Asif et al., 2018). With respect to the above debate, this study hypothesizes:

H1: Customer orientation has a positive relationship with farm performance in the dairy sector.

H2: Competitor orientation has a positive relationship with farm performance in the dairy sector.

H3: Inter-functional coordination has a positive relationship with farm performance in the dairy sector.

Figure 1. Hypothesized model.



## 2.2. Farmer resilience

Resilience can be described as buffer capacity, adaptability and transformability with increasing degrees of change required for successful agrienterprise performance (Shadbolt & Olubode-Awosola, 2013). The buffer capacity allows a system to persist by absorbing shocks (Carpenter et al., 2001; Crawford, 2007; Darnhofer, 2008; Lien et al., 2007). Darnhofer et al. (2010) describes adaptability as farmers having the strategies to persist and maintain through shocks and adapt and adopt new states when they are needed. Adaptive capacity is concerned with major disturbances that are rare, and less expected due to a major change in the underlying environment (Conway, 1991). Since buffer capacity, adaptive capacity can only work up to a certain point, when the disturbances imposed by highly dynamic environments push a farming system beyond what it can tolerate, transformation becomes the only option. Transformability is described as the ability of a manager to find new ways of arranging resources when conditions make the current systems untenable (Darnhofer, 2008).

However, despite the successful identification and description of the farmer resilience concept by current literature, the impact of the concept on farm performance is yet to be explored. To fill this knowledge gap in the context of dairy production and emerging country, this study hypothesizes:

H4: Farmer resilience has a positive relationship with farm performance in the dairy sector.

## 2.3. Market orientation and farmer resilience

Previous studies have established market orientation as a prerequisite for some of the key farmer attributes such as capacity for commercialization and innovation (Mirzaei et al., 2016; Newman et al., 2016; Ocampo et al., 2018). However, despite substantial documentation illustrating the relationship between innovation, whose presence is influenced by MO, and farmer resilience (Andes, 2016; FAO, 2020; Harvey & Natasha, 2017), the direct linkage between MO and farmer resilience is yet to be pointed out. Therefore, to contribute to further understanding of the MO and farmer resilience concepts, Figure 1 presents the hypothesized model and the hypothesis used in the study:

H5: Customer orientation has a positive relationship with farmer resilience.

H6: Competitor orientation has a positive relationship with farmer resilience.

H7: Inter-functional coordination has a positive relationship with farmer resilience.

**Table 1. Distribution of the sample proportion to size of the sub-counties population**

Sub-county	Population	Proportion to size	Sample
Kiharu	216,713	0.32	210
Maragwa	182,282	0.27	177
Kangema	92,129	0.12	79
Gatanga	195,865	0.29	191
Total	686,989	1	657

### 3. Methodology

#### 3.1. Study area

The study was conducted in Murang'a County in central Kenya. This county was purposively selected owing to the fact that majority of the households are involved in mixed farming and dairy cattle is the most important livestock species in the area.

#### 3.2. Sampling approach

The population of the study was all the smallholder dairy agripreneurs in Murang'a County who are engaged in production and marketing of milk and its products. The sampling unit for this study was the smallholder dairy agripreneurs specifically the owners of the agrienterprises in Murang'a County with focus in the following Sub-Counties Gatanga, Kiharu, Maragwa and Kangema Sub-County. The determination of the sample size followed Cochran's (1963) proportionate to size sampling methodology (see Table 1). The derived sample size for the study was 657 respondents. However, during the survey, the actual sample that was collected and used for analysis was 682 respondents.

This study adopts a quantitative research design based on cross-sectional farm household survey data collected among dairy agripreneurs involved in production and marketing of milk in Murang'a County, Kenya. Multistage sampling technique was employed to select the respondents. According to Lavrakas (2008) multistage sampling is widely used for several reasons including; where a sampling frame is non-existent and where construction of one maybe too costly to construct. Smallholder dairy farmers are widely spread and there is no sampling frame for dairy agripreneurs. Another reason is that the research is constrained with time. Therefore, multistage sampling technique was justifiable since it enabled the researcher to take advantage of the hierarchical structure of the target population and design. Based on information from the Sub-County Agricultural office, four of the main milk-producing sub-counties were purposively chosen. Within the four sub-counties, 12 wards were randomly selected and thereafter 682 dairy agripreneurs were randomly selected using proportionate to the number of households in the four Sub-Counties as shown in Table 1 below.

A semi structured questionnaire was administered to the smallholder agripreneurs by trained enumerators.

#### 3.3. Pilot study

A pilot study was conducted to test the validity and reliability of the data collection instruments. Reliability is the degree to which a research instrument would yield the same results or data after repeated trials while validity is the degree to which an instrument measures that which it purports to measure (Mugenda & Mugenda, 2013). A pretest was carried out in Kandara Sub-County since it has similar attributes to Gatanga, Maragwa, Kiharu and Kangema. The researcher administered 60 questionnaires that was approximately 10% of the required sample size for the study. The results of the pilot study were used in correcting and adjusting the final questionnaires that was administered for the study.

### **3.4. Variables measurement**

#### **3.4.1. Dependent variable**

The Connor-Davidson Resilience Scale (CD-RISC) was used to measure agripreneurial resilience (Connor & Davidson, 2003). Subjective measures of resilience have been used frequently in entrepreneurship studies (Korber & McNaughton, 2017; Salisu et al., 2019; Shadbolt & Olubode-Awosola, 2013), since they capture valid, reliable and holistic measurement of the construct if they meet the minimal convergent and discriminant validity threshold required. In addition, there is a strong correlation between subjective and objective measurement of resilience (Manzano-García & Ayala, 2013). Resilience was measured using a scale of 10 items with a 5-point range of response (0 = not true at all, 1 = rarely true, 2 = sometimes true, 3 = often true and 4 = true nearly all of the time) as indicated in Appendix A. Farm performance of smallholder dairy farmers was measured using the scale adopted by Ho et al. (2017), consisting of 5 items. Responses were subjected to how the dairy agripreneurs felt over the past 12 months (Appendix A).

#### **3.4.2. Independent variables**

Market orientation was measured using the Narver and Slater (1990), scale. The 13-item market orientation scale focused on three dimensions; customer orientation, competitor orientation and inter-functional coordination (Appendix A).

### **3.5. Data analysis**

A quantitative, correlational, and explanatory empirical analysis was carried out to identify causal relationships among variables by using a structural equation model (SEM) method. This model was appropriate due to its usefulness in analyzing both the measurement and structural models, while it allows the incorporation of both unobserved (construct/latent factors) and observed variables in the same model (Hair et al., 2017). The method also handles errors of measurement within exogenous variables having multiple indicators by the usage of confirmatory factor analysis (CFA). To calculate the proposed model, a multiple regression with Partial Least Squares (PLS) is used with SmartPLS software 3. This technique allows one to build research models by establishing latent variables. Latent variables are variables that are not observed directly but are inferred from other observed variables (indicators). Partial Least Squares (PLS) is recommended for use with variables with non-normal distributions, non-experimental research with data obtained from surveys, a not very large study sample, and a theory that has not yet been developed in a solid way (Hair et al., 2017; Henseler et al., 2015).

### **3.6. Ethical considerations**

Before the start of data collection, a research permit was secured from the National Commission for Science Technology and Innovation (NACOSTI), which is the legal body mandated to regulate research activities in Kenya. The researcher also sought approval from County Government of Murang'a Ministry of Agriculture, Livestock & Fisheries to conduct interviews. Data collection took place from 4th January to 14 February 2020. The respondents were informed of the objective of the study and informed consent was sought from the respondents. Once the dairy agripreneurs gave their consent, data was collected through personal interviews using semi-structured questionnaires.

## **4. Results**

### **4.1. Reliability and validity of the constructs**

According to Hair et al. (2017) convergent validity is achieved when a set of indicators of a construct converge or represents a single underlying construct. This validity was measured using Cronbach's alpha (CA), rho\_A, Composite Reliability (CR) and Average Variance Extracted (AVE). As presented in Table 2, Cronbach's alpha (CA) ranged from 0.747 to 0.935, rho\_A ranged between 0.747 and 0.941 and composite reliability (CR) ranged between

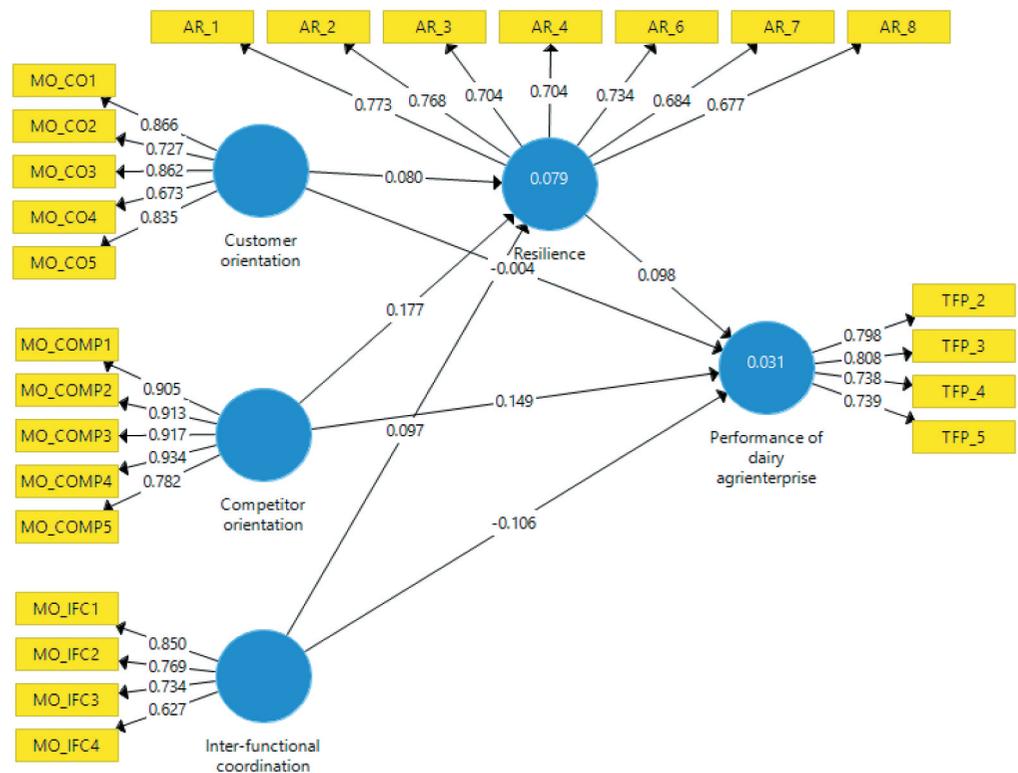
**Table 2. Reliability and validity of scale items**

Constructs	Items	CA	rho_A	CR	AVE	VIF
Competitor orientation	5	0.935	0.941	0.951	0.795	1.317
Customer orientation	5	0.858	0.922	0.896	0.634	1.508
Inter-functional coordination	4	0.747	0.795	0.835	0.561	1.803
Dairy farm performance	4	0.779	0.801	0.854	0.595	-
Farmer resilience	7	0.848	0.854	0.884	0.521	1.086

0.835 and 0.951. These thresholds exceed the minimum standard level of 0.70, hence internal consistency reliability was achieved. Convergent validity was also assessed by assessing average variance extracted (AVE) and the values exceed the threshold of 0.5 (Hair et al., 2017). Multicollinearity among the variables was tested using variance inflation factor (VIF). The results in Table 2 show that there was no collinearity among the constructs since the values were less than 5 which is the threshold (Hair et al., 2017).

Discriminant validity was tested Using the AVE-SV technique and cross loading test. The constructs passed discriminant validity test as the diagonal values were greater than the horizontal

**Figure 2. Coefficient of structural model.**



**Table 3. Discriminant validity test**

	<b>Competitor orientation</b>	<b>Customer orientation</b>	<b>Inter-functional coordination</b>	<b>Performance of dairy agrienterprise</b>	<b>Resilience</b>
Competitor orientation	<b>0.892</b>				
Customer orientation	0.262	<b>0.796</b>			
Inter-functional coordination	0.469	0.578	<b>0.749</b>		
Performance of dairy agrienterprise	0.122	-0.008	-0.016	<b>0.771</b>	
Resilience	0.243	0.182	0.226	0.11	<b>0.722</b>

*Note.* Diagonals represent the square root of the average variance extracted (AVE) while the other entries represent the correlations.

and vertical values (Table 3) and all the factor loadings were above 0.6 (Figure 2) (Hair et al., 2017; Henseler et al., 2015).

The results on cross loading test for constructs of market orientation and resilience is presented in Table 4. The findings show that all the bold values of the loading exceeded the suggested threshold of 0.50 and above, hence all the constructs had discriminant validity (Henseler et al., 2015).

#### 4.2. Hypothesis testing

To test the seven hypotheses of the research model, this study utilized Structural Equation Modeling (SEM) with Partial Least Square (PLS) approach using the SmartPLS version 3.2.6 software (Henseler et al., 2015). Model fit was analysed using the standardized root-mean-square residual (SRMR). The SRMR of 0.067 met the requirement of SRMR cut-off point of less than 0.08. Hence, the model fitted well to test the hypothesis. The analysis in Table 5, shows there is a positive relationship between competitor orientation, customer orientation, inter-functional coordination and farmer resilience. A farmer who is one standard deviation higher on competitor orientation, customer orientation and inter-functional coordination will be 0.178, 0.083 and 0.102 standard deviation higher in farmer resilience, respectively; therefore, the hypothesis H5, H6 and H7 are supported. The hypothesis H2 and H4 were also supported ( $p = 0.002$  and  $p = 0.025$ ), whereby one-unit increase in competitor orientation and farmer resilience leads to a 0.152 and 0.103-unit increase in dairy farm performance, respectively. Conversely, the result shows negative significant relationship between inter-functional coordination and dairy farm performance, and there was no relationship between customer orientation with dairy farm performance. Hence, hypothesis H3 and H6 were not supported.

#### 4.3. Discussion

##### 4.3.1. Market orientation and farm performance

The results indicate a positive significant relationship between competitor orientation and farm performance at a 1% significance level. This finding displays inconsistency with the current body of literature that have established a non-significant relationship between competitor orientation and agricultural performance (Dawit et al., 2017; Ho et al., 2017). The possible explanation for this discrepancy is that unlike in the previous studies, the Kenyan dairy sector has many opportunities that support farmers to not only compete among themselves but also positions them to be able to compete with key value chain actors such as suppliers, distributors

**Table 4. Cross loading test for constructs of market orientation and resilience constructs**

Constructs	Agripreneurial Resilience	Market Orientation
R_1	<b>0.749</b>	0.200
R_2	<b>0.747</b>	0.262
R_3	<b>0.701</b>	0.197
R_4	<b>0.660</b>	0.206
R_6	<b>0.753</b>	0.176
R_7	<b>0.691</b>	0.107
R_8	<b>0.657</b>	0.231
R_9	<b>0.633</b>	0.121
R_10	<b>0.595</b>	0.168
MO_CO1	0.158	<b>0.551</b>
MO_CO3	0.211	<b>0.546</b>
MO_CO4	0.075	<b>0.587</b>
MO_CO5	0.131	<b>0.603</b>
MO_COMP1	0.204	<b>0.769</b>
MO_COMP2	0.183	<b>0.748</b>
MO_COMP3	0.171	<b>0.777</b>
MO_COMP4	0.191	<b>0.808</b>
MO_COMP5	0.268	<b>0.693</b>
MO_IFC1	0.184	<b>0.63</b>
MO_IFC2	0.118	<b>0.641</b>
MO_IFC3	0.182	<b>0.552</b>
MO_IFC4	0.084	<b>0.599</b>

and processors and in the process improve their farm performance. These opportunities include feed formulation, group marketing and value addition strategies such as the production of yoghurt (Mwambi et al., 2018).

Inter-functional coordination was found to have a negative significant relationship with farm performance at a 10% significance level. This finding disagrees with similar studies that found a positive significant relationship between IFC and farm performance (Ho et al., 2017; Ingenbleek et al., 2013). Inter-functional coordination in the Kenyan dairy sector is expressed through group marketing of milk by smallholder farmers. However, despite group marketing achieving its desired objectives of stable milk prices and access to distant markets, it can also be attributed to decreased individual farm performance. This is because the cooperative principle of accepting whatever quantity of milk brought forward by the farmers reduces the competitive edge of farmers as they know, however, dismal their produce is, they will still receive compensation.

On an interesting note, this study found customer orientation to have no significant relationship with farm performance. This results differs with other studies that have established a significant and positive relationship between CO and agricultural performance (Ho et al., 2017; Ingenbleek et al., 2013). This inconsistency can be attributed to Kenya's unique dairy sector that has very few milk processors that operate with monopolistic tendencies hence farmers have minimal interactions with milk consumers in terms of direct milk sales (Mwambi et al., 2018). Therefore, farmers investing in gaining CO has no effect or as in this

**Table 5. Path coefficients of direct effects of market orientations and resilience on agri-  
 enterprise performance**

<b>Path relationship/ Hypotheses</b>	<b>Std. Beta</b>	<b>SE</b>	<b>t-values</b>	<b>p-values</b>	<b>Decision</b>
Competitor orientation -> Performance of dairy agrienterprise	0.152	0.047	3.164***	0.002	Supported
Competitor orientation -> Resilience	0.178	0.041	4.321***	0.000	Supported
Customer orientation -> Performance of dairy agrienterprise	-0.004	0.052	0.069	0.945	Not Supported
Customer orientation -> Resilience	0.083	0.044	1.831*	0.067	Supported
Inter-functional coordination -> Performance of dairy agrienterprise	-0.109	0.059	1.794*	0.073	Not Supported
Inter-functional coordination -> Resilience	0.102	0.051	1.886*	0.059	Supported
Resilience -> Performance of dairy agrienterprise	0.103	0.044	2.247**	0.025	Supported

study negative effect on farm performance as it is the milk processors that determine the utilities gained by the consumers.

#### 4.3.2. Market orientation and resilience

The study found a positive and significant relationship between the three dimensions of MO such as CPO, CO and IFC at a 1%, 10% and 10% significance level respectively. Competitors always a pose a threat to the financial and market performance of agribusiness enterprises and to stay ahead of them, farmers have to identify and counter their short-term strengths as well as their long-term strategies. It is therefore plausible to hypothesize that competitor-oriented farmers are well placed to identify and counter other risks that face their enterprises just as they do with their competitors. Hence, the more competitor oriented a farmer is the more resilient they are (Evans & Wall, 2019).

CO requires firms to collect information about customers and act as an advantage to identify and satisfy customer's needs and wants through the application of customer data (Ho et al., 2017). In the agricultural sector, the tastes and preferences of consumers not only vary widely but also changes from time to time sometimes unexpectedly. Therefore, customer orientation, just like resilience, requires farmers to be fully aware of their environment and be always ready to duly identify and react to changes that may occur. It is therefore apparent that the skills and knowledge required for customer orientation are also required in resilience. With this debate and results, it is accurate to postulate that an increase in customer orientations also translates to an increase in farmer resilience.

One of the major aspects of resilience is the ability of a manager to find new ways of arranging resources when conditions make the current systems untenable (Kangogo et al., 2020). IFC requires the coordinated efforts of an organization's resources in creating superior value to customers (Narver & Slater, 1990) and to generate the cooperation among all departments in the organizations to create superior value for customers (Ho et al., 2017). Inter-functional coordinated farmers are therefore skilled in the organization of their enterprises' resources in order to achieve a set objective. Kenyan dairy farmers face a volatile sector and this skill is useful in times of regular challenges such as unavailability of feeds during drought periods in order to reduce livestock susceptibility and reduce losses. Since IFC skills can be applied to boost farmer resilience through the organization of available resources, it is incontestable to theorize that increase in the IFC status of a farmer leads to an increase in their resilience.

#### 4.3.3. Resilience as a moderator

The findings on the moderating effects of resilience on the MO-farm performance relationship report a positive significant effect at a 5% significance level. Results of the moderation analysis indicate that high levels of farmer resilience results in strengthening the MO-farm performance relationship whereas MO and farm performance is weakened with low level of farmer resilience. This can be explained by the notion that both resilience and MO are triggered with the same farmer attributes i.e. environmental analysis, risk identification, risk management and resource organization (Dias et al., 2018).

### 5. Conclusions and managerial implications

This paper represents the first attempt to examine the concept of market orientation, farmer resilience, and farm performance within the dairy sector of a developing country. Although these concepts have been widely applied independently, this is the first time their interrelationships have been explored in the agricultural context. Therefore, the application of these concepts to a developing country's agriculture where issues of food insecurity, unreliable climatic conditions, and political instability among other challenges are rampant contributes valuable insights to the literature on market orientation, farmer resilience, and farm performance. The findings indicate that competitor orientation, customer orientation and inter-functional coordination are antecedents to farmer resilience. This suggests that to increase farmer resilience in the volatile Kenyan dairy sector, market orientation should be encouraged by policy incentives and support initiatives amongst the smallholder dairy farmers. To do that, development policies should encourage smallholder farmers to engage in the coordinating supply and increase their capacity to access information on customers and competitors.

The study also provides important strategic guidelines for agriculture generally and dairy production, particularly in developing countries. To enhance the performance and resilience, smallholders should concentrate on understanding customers, pay attention to competitor behavior to avoid being crushed by competition and focus on inter-functional coordination to achieve optimum use of resources. The results of this study could offer policy makers' guidelines regarding improving performance in other agricultural sectors in developing economies. The lack of market orientation can restrict the development of farmer resilience and therefore leaving farmers vulnerable to the many challenges in the agricultural sector of developing countries. Due to the established positive interrelationship between MO, farmer resilience and farm performance, strengthening of local extension staff marketing capabilities is needed. Thus, it is imperative to train extension agents on agribusiness marketing as by in turn training dairy farmers on the same, they will not only increase their farm performance but also better place them to buffer, adopt and transform when faced with challenges.

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### Appendix A Measurement items

	<b>Customer orientation (based on Narver &amp; Slater, 1990)</b>
MO_CO1	I continuously try to discover additional customer needs which they are not aware of yet.
MO_CO2	I anticipate what customer might need and suggest new products and services which I could supply to them
MO_CO2	I always try to innovate the current dairy cattle business to meet customer needs even I recognize the possibility of risk
MO_CO4	I usually think about the benefit that customers receive from my products and services benefit
MO_CO5	I contact closely with lead customers and try to recognize their needs months or even years before the majority of market may notice them
	<b>Competitor orientation (based on Narver &amp; Slater, 1990)</b>
MO_COMP1	I always collect and concern about competitor's activities
MO_COMP2	I diagnose competitor's goals
MO_COMP3	I always track the business performance of key competitors
MO_COMP4	I identify the area where our key competitors have succeeded or failed
MO_COMP5	I evaluate the strength and weakness of competitors
	<b>Inter-functional coordination (based on Narver &amp; Slater, 1990)</b>
MO_IFC1	I regularly visit my current and prospective customers
MO_IFC2	I freely discuss my successful and unsuccessful customer experiences with my partners
MO_IFC3	Actors in the dairy value chain understand how everyone can contribute to creating customer value
MO_IFC4	I always share resources with other actors in the dairy marketing chain
	<b>Agripreneurial Resilience (based on Connor &amp; Davidson, 2003)</b>
AR_1	I am able to adapt to change
AR_2	I can deal with whatever comes my way
AR_3	Tries to see the humorous side of things
AR_4	Coping with stress strengthens me
AR_5	I tend to bounce back after a hardship or illness
AR_6	I can achieve my goals despite obstacles
AR_7	Can stay focused under pressure
AR_8	I am not easily discouraged by failure
AR_9	I think of myself as a strong person

(Continued)

	<b>Customer orientation (based on Narver &amp; Slater, 1990)</b>
AR_10	I can handle unpleasant feelings
	<b>Financial performance of dairy business (based on Ho et al., 2017)</b>
TFP_1	I am very satisfied with the overall performance of the farm last year.
TFP_2	The return on production investments met expectations last year.
TFP_3	The return on marketing investments met expectations last year.
TFP_4	The price I receive for milk covers production costs
TFP_5	The overall performance of the farm last year exceeded that of previous years.

Note. MO\_CO, MO\_COMP, MO\_IFC and TFP were taken on a 1 (not at all) to 5 (very well) scale; while AR was taken on a 0 (not true at all) to 4 (true nearly all of the time) scale.



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