EFFECT OF ENTREPRENEURIAL ORIENTATION ON AGRI-ENTERPRISE PERFORMANCE AMONG AGRI-INPUT SUPPLIERS IN NAKURU COUNTY, KENYA

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DECLARATION AND RECOMMENDATION

Declaration

I declare that this thesis is my original work and has not been presented or submitted wholly or in part to any academic institution for an award of any academic certificate.

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Recommendation

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DEDICATION

To my extended family, parents, and friends, I could not have done the work without your support, care, and understanding along the way. Thank you all.

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ABSTRACT

Start-ups and small-scale agri-input suppliers (AIS) play critical roles in Kenya's agricultural development sector. Nakuru county is the hub of agricultural activities, which include leading producers of flowers, potatoes, milk, cereals, and vegetables in Kenya, creating an enabling environment for AIS start-ups to thrive by supporting the agricultural value chain as input providers to primary producers. However, competition from established, medium, and large-scale agri-input suppliers puts them at risk of closing or inhibiting their survival potential, causing economic and agricultural value chain disruption. Entrepreneurial orientation (EO) manifestations in proactiveness, innovation, and risk-taking actions and behaviour, are considered the critical aspect of any enterprise's start-up success, as they positively influence their growth and performance. The study aims to enhance sustainable agripreneurship through implementing entrepreneurial orientation actions and behaviour in agri-enterprises' operations through the development of entrepreneurial orientation levels, determining factors influencing the entrepreneurial orientation levels and their effect on agri-enterprise performance. Such focus lacks empirical evidence on AIS; hence, the study tries to fill this research gap. The study was carried out in Nakuru County, where three sub-counties were purposively selected: Nakuru-East, Nakuru-West, and Bahati. Data from 137 randomly selected respondents were captured using face-to-face interviews. Descriptive statistics: Analysis of Variance, *F*-statistics, and Chi-square was used to characterise agripreneurs' socio-economic factors, institutional networking, and agri-enterprise factors. The principal component analysis and quantile technique generated three levels: conservative-oriented, moderate-oriented, and high-level entrepreneurial oriented. The generalised ordered logit model was used to evaluate the influencing factors. Overall, the variety of traded agri-input products showed the most significant favourable influence on EO levels, followed by the business plan, partnership, customers' contracts, and gender factors. On the other hand, years of AIS operation and the number of AIS owners negatively influenced EO levels. The partial least square, a structural equation modelling technique, was used to assess the effect of entrepreneurial orientation on agri-enterprise performance. The findings revealed that entrepreneurial orientation strongly predicts agri-enterprise performance. A positive impact of 0.440 and 0.481 was identified for both components and levels, explaining 23% of the agri-input suppliers' performance. The study emphasises the importance of entrepreneurial orientation in aiding critical stakeholders in developing a solid understanding of the role of entrepreneurial orientation in shaping SME performance.

TABLE OF CONTENTS

DECLARATION AND RECOMMENDATION ..... **ii**
COPYRIGHT ..... **iii**
ACKNOWLEDGEMENTS ..... **v**
ABSTRACT ..... **vi**
TABLE OF CONTENTS ..... **vii**
LIST OF TABLES ..... **x**
LIST OF FIGURES ..... **xi**
LIST OF ABBREVIATIONS AND ACRONYMS ..... **xii**

CHAPTER ONE **1**
INTRODUCTION **1**
1.1 Background information 1
1.2 Statement of the problem 5
1.3 Research objectives 5
1.3.1 General objective 5
1.3.2 Specific objectives 5
1.4 Research questions 6
1.5 Justification of the study 6
1.6 Scope and limitation of the study 7
1.7 Operational definition of terms 8

CHAPTER TWO **9**
LITERATURE REVIEW **9**
2.1 Introduction 9
2.2 The entrepreneurial orientation concept 9
2.3 The entrepreneurial orientation dimensions 10
2.3.1 The innovation dimension 10
2.3.2 Risk-taking dimension 11
2.3.3 Proactive dimension 11
2.4 Reflective versus formative constructs of the entrepreneurial orientation 11
2.5 The concept of entrepreneurial orientation levels 13
2.6 Factors influencing the entrepreneurial orientation levels 15
2.7 Agri-input suppliers' performance concept 16

2.8 The effect of entrepreneurial orientation on agri-enterprise performance.....17
2.9 Gaps in the literature review.....18
2.10 Theoretical framework.....19
2.10.1 Institutional theory.....19
2.10.2 Entrepreneurial orientation as a resource.....20
2.11 Conceptual framework.....21

CHAPTER THREE.....23
METHODOLOGY.....23
3.1 Introduction.....23
3.2 The study area.....23
3.3 Sample size determination.....25
3.4 Sampling procedure.....25
3.5 Data collection.....26
3.6 Data analysis.....27
3.6.1 Descriptive analysis.....27
3.6.2 Determination of the entrepreneurial orientation levels.....28
3.6.3 Factors influencing the entrepreneurial orientation levels.....32
3.6.4 The effect of entrepreneurial orientation on agri-input suppliers' performance.....37

CHAPTER FOUR.....41
RESULTS AND DISCUSSIONS.....41
4.1 Introduction.....41
4.2 Descriptive statistics.....41
1.2.1 Agripreneurs' characteristics.....41
4.2.2 Agri-enterprise's features.....44
4.2.3 Institutional networks.....46
4.3 Determination of entrepreneurial orientation levels.....47
4.3.1 Reliability and validity tests.....47
4.3.2 Factor extraction and retention.....50
4.3.3 Components rotation.....51
4.3.4 Components score computation.....51
4.4 Determination of factors influencing the entrepreneurial orientation levels.....52
4.5 Effect of entrepreneurial orientation on agri-input supplier's performance.....58

4.5.1 The measurement model design 58
4.5.2 The effects of entrepreneurial orientation on agri-input supply performance 59

CHAPTER FIVE 61
CONCLUSIONS AND RECOMMENDATIONS 61
5.1 Conclusions 61
5.2 Recommendations 62
5.3 Suggestions for further research direction 62

REFERENCES 63
APPENDICES 75
Appendix A. Survey questionnaire 75
Appendix B. Research permit 84
Appendix C. Paper abstract 85
Appendix D. Principal component analysis 86
Appendix E. Principal components (eigenvectors) 87
Appendix F. Orthogonal varimax rotation estimation 88
Appendix G. Scree plot 89
Appendix H. Factor score prediction 89
Appendix I. Parallel-line assumption test 90
Appendix J. Generalised ordered logit estimates 91
Appendix K. Entrepreneurial orientation components path coefficient 92
Appendix L. Entrepreneurial orientation levels path coefficient 93

LIST OF TABLES

Table 1. Agri-input suppliers sample distribution in the three sub-counties 26
Table 2. The KMO threshold values 28
Table 3. Statements used to assess the entrepreneurial orientation levels 31
Table 4. Summary of regressions models 33
Table 5. Variables used in analysing the factors influencing entrepreneurial orientation levels 35
Table 6. Variables used to assess the effect of entrepreneurial orientation on agri-input suppliers' performance 40
Table 7. Description of age and years of schooling on levels of entrepreneurial orientation .42
Table 8. Description of agripreneur's characteristics on EO levels 42
Table 9. Description of agri-input supply characteristics on entrepreneurial orientation levels 45
Table 10. Description of institutional factors on entrepreneurial orientation levels 47
Table 11. Reliability and validity test results 48
Table 12. The results of principal components' eigenvalues 50
Table 13. Entrepreneurial orientation generated levels 52
Table 14. Analytical results were generated using the GOL model for EO levels. 53
Table 15. Results of the effect of entrepreneurial orientation on AIS performance. 59

LIST OF FIGURES

Figure 1. Conceptual framework 22
Figure 2**.** Map of Nakuru County (The study area) 24

LIST OF ABBREVIATIONS AND ACRONYMS

AIS	Agricultural Input Suppliers
ANOVA	Analysis of Variance
AVE	Average Variance Extract
BLUE	Best Linear Unbiased Estimates
CGoN	County Government of Nakuru
CR	Composite Reliability
CRR	Customer Retention Rate
EFA	Exploratory Factor Analysis
EO	Entrepreneurial Orientation
EP	Employee Productivity
GDP	Gross Domestic Product
GOL	Generalised Ordered Logit
GUI	Graphical User Interface
HRM	Hierarchical Regression Model
KEPHIS	Kenya Plants Health Inspectorate Service
KMO	Kaiser-Meyer- Olkin
KNBS	Kenya National Bureau of Statistics
KVB	Kenya Veterinary Board
MLE	Maximum Likelihood Estimation
MSME	Micro Small Medium Enterprise
NGO	Non-Governmental Organization
OLS	Ordinary Least Square
PCA	Principal Component Analysis
PCPB	Pest Control Products Board
PLS-SEM	Partial Least Square, a Structural Equation Modeling
POM	Proportion Odds Model
PPO	Partial Proportion Odds
RBV	Resource-Based View
RCMRD	Regional Centre for Mapping of Resources for Development
RMSEA	Root Mean Square Error of Approximation
ROI	Return on Investment
SD	Standard Deviation

SDGs	Sustainable Development Goals
SG	Sales Growth
SIBD	Strategic Involvement in the Board of Directors
SME	Small and Medium Enterprises
SPSS	Statistical Package for the Social Sciences

CHAPTER ONE
INTRODUCTION

1.1 Background information

Kenya's micro, small and medium establishment (MSME) sector has been identified and prioritised as a critical driver for the country's economic growth and development. The MSME sector plays essential roles in goods and service provision, linking supply chains, creating wealth, employment, public revenue, and alleviating poverty. The Kenyan government, academic institutions, and non-government organizations (NGOs) have extended their entrepreneurial support by increasing attention and recognizing entrepreneurial efforts as a partial solution to the economic crisis. The entrepreneurship emphasis has been a tradition in Kenya since its independence; several sessional papers, policies, and programs have been established to stimulate growth and support the MSMEs sector in Kenya (Micro, Small, Medium Establishment [MSME], 2016). These development initiatives include enterprise development fund, uwezo fund, women enterprise fund, youth enterprise development fund, and agribusiness prototype funds, mainly targeting Kenyan youths and women, who comprise over 70% of the county's population. The supported groups are expected to establish and sustainably run enterprises to empower them into gainful self-employment (Grande *et al.*, 2011; KNBS, 2020; Sambo, 2016; Waruguru *et al.*, 2017).

Business performance in their early growth stage, remains a crucial phase that requires entrepreneurial support to ensure their survival. According to the MSME (2016) report, 2.2 million MSMEs had closed their operations within five years, representing 46% of all business establishments. Nevertheless, start-ups in existence within two years were most vulnerable to survival as they accounted for 63% of the total business closure, reporting a lack of working capital as the main reason for closure (MSME, 2016). According to MSME (2016), about 37% of agri-enterprise start-ups closed their business operation within their first years. Business licensing in Kenya for agri-enterprises, a single business permit, is a county government regulatory mandate to provide charges in the respective county finance acts. Agri-enterprises form the highest number of unlicensed businesses in the country's economy. MSME (2016) states that almost 99% of agri-enterprises operate unlicensed. Agri-input suppliers (AIS), commonly known as *agrovet* locally, are among highly licensed agri-enterprises due to the nature of their economic activities, which require other statutory regulations. The AIS regulators include the Kenya Veterinary Board (KVB), which regulates the importation, production, and distribution of animal health products and services (Kenya

Veterinary Board [KVB], 2018). Kenya Plant Health Inspectorate Service (KEPHIS) statutory parastatal mandated to undertake seed certification as well as regulate the importation, production, and distribution of quality seeds in Kenya (Kenya Plant Health Inspectorate Service [KEPHIS], 2017). Pest Control Products Board (PCPB) is a statutory agency established to regulate the importation, manufacturing, supply, and usage of pest control products in Kenya.

Agricultural input supply chain is faced by unique business operation challenge since they are compounded with multiple regulators that oversee their operation. The challenge creates a barrier to new and small-scale AIS who become more vulnerable to survive and become an established venture; most of the new start-ups close their operation within the first year of existence, thus, contributing to a higher percentage of agri-enterprises failure and closure as reported by MSME (2016) report. Micro and small-scale AIS, due to their size, face numerous challenges, among them, resource acquisition to attain a sustainable competitive advantage; hence, they have to rely on the owner's entrepreneurial orientation (EO) to survive and grow in the turbulence business environment (Hussain, 2015; Islam *et al*., 2009). An increasing number of AIS surviving at the early stage of their operations remain an essential agripreneurship focus to agricultural researchers in order to add new knowledge, minimise economic loss and also disruption of the agricultural value-chain (Wang *et al.*, 2017).

Entrepreneurial orientation is a concept that craft new strategies that are aimed at exploiting new opportunities that other ventures haven't realized; it is a sub-division of entrepreneurship theme that focuses on how start-ups should be carried out (Certo *et al.*, 2009). The phenomenon is considered a creative and innovative progression that entails: the introduction of new products and services, services and products' value-addition, market diversification, employment opportunities, welfare improvement as well as economic development and expansion (Esfandiar *et al.*, 2019; Vij & Bedi, 2012; Yoo & Kim, 2019). The evolution of EO construct as strategic managerial action and behaviour is recognised as the primary internal resource that supports enterprises' growth and performance in a competitive environment. Business world is changing rapidly, that non-entrepreneurial enterprises are at risk of being left out or phased out of existence. Because the world is changing so rapidly, non-entrepreneurial organizations are at significant risk of being left behind. And companies left behind are often gone in fairly short order. The EO is therefore considered an essential asset when addressing business growth, sustainability and

performance in the ever-changing environment exacerbated by government intervention and customers' needs fluctuation conditions (Certo *et al.,* 2009; Waruguru et al., 2017). These hostile business situations force entrepreneurs to learn and acquire acquaintances to develop new strategies, knowledge, and skills that satisfy customer needs and sustain dynamic markets (Prajogo & Ahmed, 2006). Hence, embracing an EO approach has been widely recognized and accepted as a powerful asset that can help agri-enterprises achieve superior performance by recognising opportunities presented by the operative environment and threats exhibited by the competitors and working environs (Bogatyreva *et al.,* 2017).

The concept of EO has been described and considered in prior research as a strategic making exercise that identifies opportunities arising from an operative environment and trails threats exposed by the rivals (Lumpkin & Dess, 2001). The EO construct is also reflected as a vital tool coherent with agri-enterprises' tactical attitude and position, from being a conservative to an entirely entrepreneurial oriented one (Lumpkin & Dess, 2001; Vij & Bedi, 2012). For AIS, sustained growth and performance define their success. These accomplishments entail financial and sales achievement, marketing strategies, customer orientation, human resources, and overall performance objectives. These endeavours can be attained through practical application and implementation of EO in achieving superior performance and success (Vij & Bedi, 2012).

The term EO holds numerous connotations and attitudes; however, according to Fadda and Sørensen (2017), three described dimensions: innovation, risk-taking, and Proactive proclivities, are the commonly recognised features in the EO literature that define entrepreneurial-oriented agri-enterprise. According to Vij and Bedi (2012), EO is a tactical alignment, usually perceived as the magnitude of agri-enterprise growth and performance. It involves recognizing innovative wits and the exhibition of proactive actions while engaging in well-calculated risk projects to gain defensible competitive and first-mover advantages (Bogatyreva *et al.,* 2017).

The risk-taking strategies involve agripreneur's willingly and productive commitment of scarce resources to projects with an uncertain outcome(s). However, such action does not refer to gambling or an uncontainable risk but rather a well predictive and calculated risk (Anderson *et al.,* 2015). On the other hand, the proactiveness dimension involves aggressive actions directed at rival agri-enterprises in pursuit of favourable agribusiness opportunities, aiming to gain a first-mover advantage. It is also an aptitude to take creative initiative each time the situation demands such actions in defence and the offence (Vij & Bedi, 2012).

Innovation is an essential factor in agripreneurship. It consists of an agripreneur's attitude and willingness to act in anticipation of future needs in search of new opportunities arising from the ever-changing operating environment. It involves the development00 or improvement of new wealth-producing resources or endows existing ideas, concepts, products, services, processes, or tactics with enhanced potential to create richness (Thijs, 2018). Innovative coordination is associated with higher enterprise sustainability; it increases the chances of an enterprise's capability to achieve a first-mover advantage, gain a sustained competitive advantage, and take advantage of emerging market opportunities that result in financial success (Kreiser, 2011).

The concept of business performance reveals the organizational strategic efficiency and effectiveness in achieving set goals and objectives (Gupta & Batra, 2016). Startup enterprises depend on the founder's EO as a pivotal contributor to building a sustainable business performance that gains competitive advantage over time (Leiva *et al.,* 2014). The business performance relationship with EO depended upon the indicators used to evaluate performance (Mason *et al.,* 2015). Financial or objective measures are the easiest to capture and entail accounting information that reflects a business's past financial performance, as recorded in the accounting books. These indicators include sales growth, profitability, market value, and business growth (Mahmood, 2013; Wambugu *et al.*, 2016). On the other hand, subjective or non-financial measures entail pursuing the perception of the owner on performance indicators such as the volume of sales, profits, customer orientation, market orientation as well as overall business performance relative to that of the competitors or that of past performance during a specific period (Mahmood, 2013; O'Cass, 2014; Sok *et al.*, 2017).

The study adopted the EO construct proposed by Miller's (1983) that the EO is described by three dimensions' construct: innovation, proactiveness, and risk-taking. The study excluded the additional Lumpkin and Dess (1996) aspects because of the similarities between competitive aggressiveness and proactive in terms of statement indicators. In essence, proactiveness emphasises aggressiveness. The correspondence suggests the two elements are highly correlated; however, proactiveness represents EO in aggressive activities (Fadda & Sørensen, 2017; Fairoz *et al.*, 2010). On the other hand, the autonomy dimension is considered an internal organizational structure, making it an unsuitable measure of the EO context. Additionally, there is an advanced consensus amongst EO researchers that Miller's three dimensions' construct correctly display high levels of EO measurement, validity, and reliability (Fairoz *et al.*, 2010; Rezaei & Ortt, 2018; Rezaei *et al.*, 2017).

Analysis of business progression established from government business funds, reported worrying trends of business failure among Kenya's youth and women beneficiaries of government funds. The examination revealed that one in every three established enterprises failed to succeed within more than six months of operation (Sagwe *et al.*, 2011). The failure translates into the loss of capital, employment, and disruption of economic systems. However, implementing EO as a business goal prevents such avoidable mistakes from occurring (Campos *et al*., 2017; Casillas & Moreno, 2010; Waruguru *et al.*, 2017). Therefore, new, micro, and small-scale AIS must exhibit EO by concurrently demonstrating innovative, proactive, and risk-taking actions and behaviour to grasp untapped opportunities arising from complex business operating environment characterised by ever-changing business environment.

1.2 Statement of the problem

Agri-input suppliers play a vital role in agricultural supply and value chains as they link manufacturers of agri-inputs and services to farmers who are majorly final users, create wealth and employment opportunities, as well as support the production of crop and livestock enterprises. There are several new agripreneurs in Nakuru County, most operating on a micro and small-scale basis. However, according to past studies, many agri-enterprises often fail to survive more than a year of their establishment. The failure is linked to the inadequacy of the EO in the AIS's decision-making process and operations. The EO's actions and behaviour are considered a critical driver for the continuity of any enterprise. It facilitates the venture's ability to identify innovative prospects and extortions in the operative condition. Despite the existing body of knowledge on the importance of the EO approach on enterprise performance, the tactic has rarely been taken in agripreneurship literature, and it remains an under-explored concept in agri-enterprise development in Kenya.

1.3 Research objectives

1.3.1 General objective

To enhance sustainable agripreneurship through implementing entrepreneurial orientation actions and behaviours in agri-enterprises' operations.

1.3.2 Specific objectives

i. To describe entrepreneurial orientation levels among agri-input suppliers in Nakuru County.

ii. To determine factors influencing the entrepreneurial orientation levels among agri-input suppliers in Nakuru County.
iii. To evaluate the effect of entrepreneurial orientation on agri-input suppliers' performance in Nakuru County.

1.4 Research questions

i. What are the levels of entrepreneurial orientation among agri-input suppliers in Nakuru County?
ii. What factors determine entrepreneurial orientation levels among agri-input suppliers in Nakuru County?
iii. What is the effect of entrepreneurial orientation on agri-input suppliers' performance in Nakuru County?

1.5 Justification of the study

Government agencies, policymakers, researchers, NGOs, and academic and training institutions in Kenya have increased their efforts to revive the agricultural sector. These agencies support new, micro, and small-scale agri-enterprises ventures, including AIS, to foster broad-based economic growth and expansion. The support majorly relied on traditionally training agripreneurs on management skills, accounting, and record-keeping as the primary tool for them to establish and sustainably run a business (Campos *et al.*, 2017). However, a 37% rate of AIS and other agri-enterprises establishments failing to succeed within five years of their operation is a threat to stakeholders' efforts to streamline the agricultural value chain, realise the big four agenda, and attain sustainable goals development goals (SDGs) and achieve vision 2030. However, these development strategies have identified agripreneurship as a vital strategic tool to revive the agricultural sector, create the country's wealth, and make Kenya a globally competitive and prosperous nation.

Nevertheless, psychological training, which entails the transformation of an agripreneur's mindset by integrating EO actions and behaviour in a business's daily operations, has positively impacted business growth and development. The food security and nutrition pillar of "the Big 4 Agenda" aims to produce 1,000 small-scale agri-enterprises, create 600,000 new Agri jobs, and increase the agricultural sector's contribution to GDP by 48 per cent. In order to achieve these set goals, the government must revitalise the large-scale commercialization of agriculture production: crops, orchards, and animal production. The AIS plays an essential role in the government's realisation of agricultural sector revitalization interventions since they link agri-input manufacturers with final users. Government agencies

must develop a surge in agripreneurship through extensive training on EO and design policies that create a favourable business environment for start-ups and micro and small AIS to thrive. Hence, the proposition of the EO approach through training, coaching, and mentorship in taping hidden treasure of innovation, proactiveness, and risk-taking actions and behaviour in upscaling business performance. Therefore, this study's findings form reliable evidence with a practical approach and strategy recommendations that can be implemented in the realization of the Big 4 Agenda, SDGs, and vision 2030 in fostering broad-based economic expansion.

1.6 Scope and limitation of the study

The study focused on micro and small-scale AIS with less than 50 employees, either casual, permanent, or family workforces in Nakuru County. The focus was also on AIS, which trades crop inputs, animal health products, and services, and has been in operation for at least two years (since 2017) in Nakuru county boundaries across three sub-counties: Nakuru East, Nakuru West, and Bahati. The study focused on Miller's construct: innovation, risk-taking, and proactiveness to assess the entrepreneurial orientation of the agri-input suppliers. The study assumed a strong likelihood that the most knowledgeable person would answer the survey, and the views of the single respondent reflect the perception of the entire agri-enterprise rather than individual perceptions. The study considered only licensed agri-input suppliers by licensing office, the county government of Nakuru.

The study considered innovation, proactiveness, and risk-taking variables critical factors affecting agri-input supply performance. However, other variables, for example, market orientation, customer orientation, employee productivity, cost focus, and technology acquisition, may affect AIS performance, hence, merit further investigation. The concept of performance in this study was limited to an objective approach where sales information was captured for two years (2017 and 2018). In order to obtain a more accurate picture of the AIS overall performance, the inclusion of various performance indicators over a more extended time can be considered in future investigations.

1.7 Operational definition of terms

Agri-enterprise is a virtual or physical place where agricultural products or services can be accessed for a transaction.

Agri-Input Suppliers (*AIS*)- is an enterprise that trades any combination of crop inputs and services, animal health products, and services.

Agripreneur- is an entrepreneur who realises new opportunities in agricultural-related conditions to establish an agri-enterprise.

Agripreneurship- is the realization of new opportunities arising in the agricultural sector.

Entrepreneurial orientation- is a strategic decision-making approach that provides agripreneurs with innovative actions that help them to proactively prevail in a competitive environment attaining a sustainable competitive advantage by undertaking moderate risk.

Entrepreneurship- is the process that involves the realization and utilization of new business opportunities that arise in the operating market environment.

Innovation- Is an attitude and willingness of an agripreneur to develop or improve the new or existing wealth-producing resource.

Performance- It is an outcome of the daily business activities over a certain period; the study focused on sales growth and employee productivity as measures of agri-input supplier's performance.

Proactiveness- aggressive actions directed to agri-enterprise's rivals in pursuit of favourable opportunities to gain first-mover advantage.

Risk-taking- is the agripreneur's willingness to commit scarce resources to tasks with an uncertain outcome.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This section analyses the collected work about the field of entrepreneurial orientation, which entails: the confinement of the EO concept, its dimensions, and its conceptualised constructs. It develops a more in-depth discussion on the conceptualisation of EO levels, factors influencing the EO, and the EO-performance relation effect. The literature research gap was tackled in this chapter. A theoretical framework embedded in the study is well explained in the section, and a conceptual framework shows the variables' interrelationship.

2.2 The entrepreneurial orientation concept

The EO phenomenon is considered a driving force enterprises pursue to achieve sustainable results by executing entrepreneurial strategies and actions (Covin & Wales, 2012). The EO has been a strong focus in the entrepreneurship literature; it is a significant concept whose subject has been in discussion for over three decades. In entrepreneurship research, EO is receiving substantial theoretical and practical consideration, signifying a growing field of entrepreneurship research. It is recognised and categorised as a critical organizational practice that helps enterprises to survive in a competitive environment. It also improves performance by providing a foundation for innovative resolutions and activities. Therefore, EO is regarded as a strategic tool utilised by enterprises to achieve their set objectives, vision, and purpose (Rauch *et al.*, 2009).

The EO expedites new, micro, and small enterprises with the capability to identify innovative market opportunities that yield higher returns (Wiklund & Shepherd, 2005). Entrepreneurs, with little obligation to building EO in operating their business, fail to skim higher profits offered by innovative opportunities. Thus, these opportunities require ventures to reconfigure their capability, resources, and expertise (Wiklund & Shepherd, 2005). The high rate of start-ups AIS failure to succeed more than a year in operation shows the inadequacy of EO dispensation. Therefore, agripreneurs must combine their sustained entrepreneurial actions and behaviour with the managerial disposition in their business operations to benefit from EO (Covin & Lumpkin, 2011).

The discoverer of the EO concept was first initiated by Miller's (1983) work, who stated, "An entrepreneurial oriented enterprise is the one that participates in proactive, risky, and innovative actions in advance of their contestants." Lumpkin and Dess (1996) reinforced Miller's explanation of EO by defining it as a managerial disposition and actions that are

risk-taking, innovative, and proactive, resulting in a first-mover advantage, sustainable, and prosperous enterprise. Miller's (1983) work suggested three dimensions that define EO: innovation, proactiveness, and risk-taking. On the other hand, Lumpkin and Dess (1996) recommended the five EO dimensions: risk-taking, innovation, proactiveness, autonomy, and competitive aggressiveness explicitly. Besides, the five EO dimensions are presumed to vary independently, subject to the operating environment and tectonic setting. This study adopted Miller's (1983) three-dimensional construct of EO to test its applicability in the agri-enterprises context in Kenya.

2.3 The entrepreneurial orientation dimensions

2.3.1 The innovation dimension

Innovation is a disposition of an enterprise to try new ways, processes, or products that are different from the existing ones and the willingness to devise an inventive approach in the market domain (Anderson *et al.*, 2015). According to Thijs (2018), innovation is defined as an entrepreneurial function that creates new wealth-producing resources or else bestows the existing supply with enriched potential for wealth creation. It replicates the propensity to employ and support different unique concepts and resourceful procedures that improve the existing one (Lumpkin & Dess, 2001). A study by Miller (2011) conceptualised the entrepreneurial model of specific product-market strategies if pursued by any enterprise consistently, aggressively, and creatively, giving a competitive advantage. Scholars in the field of EO view innovation in diverse ways. For instance, Miller (1983) perceived innovation as a product market that involves practices and actions related to marketing strategies, product, and service development. On the other hand, Dess and Lumpkin (2005) viewed innovation in terms of technological perspective as a creative act of high technical expertise in the product, services, and marketing development.

Measures of innovation dimension vary based on whether it is product-market or technological oriented (Miller, 2011). High levels of innovation signify a strong commitment toward creative practices within the business operative environment and its internal structure (Genc *et al.*, 2019). The study by Lumpkin and Dess (2001) proposed an array of innovativeness definitions that designate the entrepreneur's inclinations toward product-market innovation. Firstly, innovation is defined as the readiness and willingness of the entrepreneur to try new products and market segments. It is also defined as a pursuit and commitment to market leadership, product and service development, and advancement. Such definitions emphasise that any agri-enterprise must prioritise funds allocation towards

activities of new product-line development (Miller, 2011; Thijs, 2018). Technological innovation, on the other hand, focuses on the entrepreneurs' aspiration to try new strategies, processes, or production systems (Miller, 2011).

2.3.2 Risk-taking dimension

Risk-taking is an agripreneur's behaviour of willingness to compel considerable resources to new prospects in uncertain environments, with an unpredictable outcome whose failure might be costly (Tajeddini, 2010; Vij & Bedi, 2012). Covin and Lumpkin (2011) identified three types of risk-taking faced by entrepreneurs: occupational, monetary, and personal. Occupational risks are related to the risk associated with an entrepreneur's entrance into a new, untested market segment as well as committing resources to unconfirmed business procedures. Financial risk refers to heavy reliance on external sources of funds for business growth and expansion. Personal risk relates to decision-makers who may be allied to a particular strategic course of action. Entrepreneurs in possession of EO will always engage in risky activities. Such commitment involves enormous resources in anticipation of gaining advanced business performance by pursuing new opportunities in the market (Mwangi & Ngugi, 2014). In such a competitive environment, all enterprise activities must entail moderated, well-calculated risks and not gambling in the context of EO (Anderson *et al*., 2015).

2.3.3 Proactive dimension

Proactiveness is viewed as acting on market leadership positions by anticipating customers' future needs (Anderson *et al.,* 205; Lumpkin & Dess, 2001; Vij & Bedi, 2012). It entails providing new, improved products and services that suitably meet consumers' expectations. It involves actions that exploit new opportunities in the market by making tailor-made products, services, or processes (Lumpkin & Dess, 1996).

Researchers have resolute that EO dimensions form critical drivers for business sustainability and performance; however, despite their importance, not many scholars have focused on addressing their essence in agri-enterprise development, creating a critical research gap.

2.4 Reflective versus formative constructs of the entrepreneurial orientation

The study adopted three dimensions' construct: innovation, proactiveness, and risk-taking, proposed by Miller (1983) and consistently accepted by various authors as the best conceptualisation that defines the EO. This basic query brings into existence the two

constructs: reflective and formative. According to George and Marino (2011), formative constructs exist when enterprises possess a higher level of EO due to being more innovative, proactive, and risk-taking. On the other hand, a reflective construct occurs when enterprises are more dynamic, creative, and risk-taking because they have a higher EO level.

The conceptualisation of EO as a formative view has been implicitly adopted by numerous authors who have studied it by examining individual dimensions of the construct. The single assessment of the aspects yields results that show the independency of their interrelation. This view argues that the combination of separate independent dimensions forms EO. The formative definition infers that EO is conceptualised from its dimensions rather than the manifestation of dimensions to define the EO (George & Marino, 2011). Therefore, EO is specified, or "formed," by its dimensions, and its meaning emanates from the dimensions to EO, a conceptualization referred to as a second-order formative model (George, 2011).

The definition of the EO reflective construct assumes the covariance of the three dimensions, which has consistently been the case in empirical studies in the EO field. However, the individual dimension independence is assumed because the common variance only represents EO under this definition; any variation due to factors other than EO is attributed to error difference. Conversely, if EO is defined as a second-order formative construct, the dimensions can vary independently and may or may not co-vary (Covin & Wales, 2012).

In light of the definitions and conceptual development of EO, it is believed that an enterprise with an EO is reflected in innovation, proactiveness, and risk-taking as a strategic posture rather than generated by its dimensions. Nevertheless, several discrepancies are noted among EO definitions and its conceptual domain; a large number of studies have defined EO as an organizational phenomenon related to the enterprise's processes, methods, and decision-making activities (Covin & Wales, 2012; Fatoki, 2019; Hughes & Morgan, 2007; Rauch *et al*., 2009). In inference, EO appeared to represent a multifaceted conception rather than merely adding its dimensions; therefore, the three dimensions' concept adopted means they are solely a reflection of EO as the representation of the enterprise's strategic position. George and Marion (2011) theoretically suggested that it is expected that an increase in EO, as an enterprise action, increases in all of its dimensions. For example, would it be more entrepreneurial if we were to take an agri-enterprise and increase its innovativeness without increasing risk-taking and proactiveness? We would argue that changing one dimension in isolation does not represent a change in strategic posture but rather only one aspect of it. As

such, it is considered that a reflective model of EO is more consistent with the theoretical and conceptual definition of the construct. The reflective construct assumes the underlying dimensions give rise to EO. In this view, EO is expected to lead from the results of its measures with similar antecedents and consequences. The first-order measurement assesses dimensions through their corresponding manifest variables. The second-order, conversely, assess EO by the three components as reflective indicators of the underlying second-order construct of the EO. The study adopted the reflective second-order construct as suggested by Covin and Wales (2012), and George and Marino (2011).

2.5 The concept of entrepreneurial orientation levels

Studies by Miller and Friesen (1982) and Miller (1983) were the first scholars to bring insight into the EO levels. They suggested the measurement of EO through a combination of the three dimensions that generally signal specific EO actions and behaviour. Under their conceptualisation of EO, an entrepreneurial-oriented enterprise is one in which a recurring pattern of entrepreneurial behaviours is observable, specifically, those behaviours that are innovative, proactive, and risk-taking in nature (Anderson & Eshima, 2013; Maldonado *et al.*, 2016). They concluded that proactivity, risk-taking, and innovation substantially impact the level of EO adopted and executed by MSMEs. The assumption of Miller's (1983) three-dimension concept transcribes the tentative view of entrepreneurship as a composite weighing the three dimensions. This definition identifies a reflective relationship between EO and its dimensions, suggesting that EO is a composite of the three dimensions, and their aggregation creates it. Covin and Wales (2012) revealed an EO assumption that enterprises fall in between a continuous variable that ranges from the conservative, the 'lowest end,' to an entrepreneurial level, which is the highest one. To endure a turbulent operative environment, Agri- enterprises must possess high levels of EO to achieve consistent capacity preservation to sustain their worth (Pittino *et al.*, 2018).

Perfect and clear definition and demarcations of entrepreneurial orientation levels in past studies is a scant phenomenon. However, it is worth noting that some researchers who have considered EO levels have associated a high score of EO derived from various score computation methods with the higher entrepreneurial-oriented level, while the low scores signify a conservative orientation level. In their study, Covin and Wales (2012) considered an EO paradigm that ranged from the exhibition of conservative strategic behaviours to those that are more entrepreneurial-oriented. Summating individual responses on the 9-items they identified to measure three EO dimensions obtained overall EO scores. Their scale showed

high scores that indicated a higher entrepreneurial orientation level, while lower scores indicated a more conservative orientation level.

In his study, Madsen (2007) developed an EO level model based on EO variation over three years (2000-2003). Using the three dimensions' construct to assess EO, each dimension's scores were added into a single factor to obtain a total EO score after the reliability and validity test. The EO was classified into higher, same, or lower levels by comparing the 2000 EO score with that of 2003 EO scores: EO 2003> EO 2000 (higher level) EO 2003= EO 2000 (same level) EO 2003<EO 2000 (lower level).

Studies by George and Marino (2011), and Arzubiaga *et al.* (2017) pointed out that using a summated scale score to represent a latent construct can result in inconsistent structural estimates since the measures are all imperfect reflections of the underlying construct. While lower levels of EO are quickly rejected in the variation selection retention process, increasing levels of EO provide a reason to overcome the inertial forces; the effect on the dependent variable is stable only in the presence of higher levels of EO. When summated scores are generated using a weighted score computations method such as regression and Bartlett, a positive sign happens when the variables with greater weight take high values and a negative when they take low values. Both methods assume a mean of zero value of all variables

In their experiment, Campos *et al*. (2012) used a 7-point Likert scale ranging from strongly disagree to agree strongly to measure business inclination towards EO. Entrepreneurial orientation mean scores were calculated from the average of the 14 manifest variables. They concluded that the higher the score, the more it indicates that the firm demonstrates an EO. Fatoki (2012) study obtained an average total score of the EO items to give out an overall EO score index. The high score index indicated a higher level of engagement in EO, while the low score index indicated a low level of involvement in EO.

A Study by Arzubiaga *et al.* (2017) on the moderating effects of family, women, and strategic involvement in the board of directors on EO-performance relation, evaluated the strategic involvement in the board of directors (SIBD) using four items assessed on an 11-point scale (0 = very low to 10 = very high). Responses of the four items then formed an index to calculate the average. They dichotomised the data by grouping the SIBD scores (ranging from 0 to10) into three equal categories (low, medium, and high levels of SIBD). Obschonka and Fisch (2018), in their assessment of EO in political leadership, identified higher scores as an indication of open-mindedness, intellectual curiosity, and global diversity, while those with low scores favour conventional traditions and conservatism.

2.6 Factors influencing the entrepreneurial orientation levels

The central proposition regarding EO is that those enormously entrepreneurial-oriented enterprises are better prepared to change in dynamic competitive environments than their conservative foils (Sirén *et al.,* 2017). In an ever-changing operative environment, coupled with continuous customer demand fluctuation, government intervention, new market entrants, and new products developed to create new market opportunities. Enterprises that lack EO are likely to be phased out of the competitive market or fail to reap any profit from such rewarding opportunities (Hussain, 2015; Ogueze *et al.,* 2017). Past studies have collected sufficient evidence that applauds environmental turbulence creating an enabling environment for enterprises to thrive in advanced levels of EO, which are mediated by business management structures (Morris *et al.,* 2007).

On the other hand, enterprises that possess EO in pursuit of new opportunities always have favourable implications on their agri-enterprise growth and performance. Government intervention forces affect the supply and demand of resources available for enterprise utilization. These forces change enterprises' structural design, culture, and strategic orientation (Arief *et al.,* 2013). The rapid evolution of the operative environment creates a survival challenge that requires an enterprise to adopt EO to keep up with the ever-changing operative environment. The situation encourages micro and small enterprises to develop innovative tactics, proactive actions, and risk-taking behaviour that anticipate future opportunities (Al-swidi & Al-hosam, 2012). The EO actions and behaviour associated with enterprise performance differ from earlier research based on tactical learning from mistakes performed in business undertaking and suggest a detailed acquaintance of the relationship between EO and the four critical aspects of strategic learning (Sirén *et al.,* 2017). According to Sirén *et al.* (2017), enterprises should decide to accommodate various features of strategic learning since their influence are subject to the levels of EO, the size, and the age of the enterprise.

The trading and marketing of agricultural inputs is a critical and pivotal force in the agricultural sector revolution; hence, operational regulation by government agencies is compulsory. Various statutory bodies regulate AIS operations. Firstly, is the single business permit a regulatory certificate issued by the County government of Nakuru to business owners to operate any legal business within the county boundaries. The Kenya pest control products board (PCPB) is a statutory body that regulates and approves crop pesticides sold in the local market, whether they meet quality standards or have not expired. Kenya plant health inspectorate Service (KEPHIS) ensures, among other obligations, quality marketed

agricultural inputs and produce such as seed crops to prevent adverse impacts on the economy, human health, and environment in Kenyan territory. Kenya Veterinary Board (KVB) regulates the conduct of animal health practitioners. Therefore, the level of education is a critical element of the operation of AIS. It is a requirement to have a minimum level of certificate qualification in animal health management or veterinary to trade any related veterinary products or services. Failing to hold such qualifications, the trader should not trade veterinary products (KVB, 2018).

2.7 Agri-input suppliers' performance concept

The enterprise performance has numerous meanings based on the perception of the definer. Among multiple definitions, the following keywords are consistent; that enterprise performance is characterised by the capability of the agri-enterprise to generate pleasant outcomes set by the owner in a specified time (Aisyah *et al.,* 2017; Islam *et al.,* 2011). It is a multi-dimensional concept, with literature outlining great diversity in defining the EO-performance relationship. The first concept views enterprise performance as an objective or financial measure, while the other view it as a subjective or non-financial measure. Both ideas are consistently used across different entrepreneurship journals (Kurtulmuş & Warner, 2015; Mahmood & Hanafi, 2013; Sok *et al.,* 2017; Vij & Bedi, 2012; Wambugu *et al.,* 2016).

The relation between EO and business performance depends upon the indicators used to assess performance (Mason *et al.,* 2015). Financial or objective measures entail accounting information that reflects a business's past financial performance, as recorded in the accounting books. These indicators include sales growth, profitability, market value, and business growth (Mahmood & Hanafi, 2013; Wambugu *et al.,* 2016). On the other hand, subjective or non-financial measures entail pursuing the perception of the owner on performance indicators such as the volume of sales, profits, customer orientation, market orientation as well as overall business performance relative to that of the competitors or that of past performance during a specific period (Mahmood & Hanafi, 2013; O'Cass, 2014; Sok *et al.,* 2017).

According to Santos and Brito (2012), both subjective and objective performance indicators consistently result in how businesses perform equally. The argument ascertains the reliability of the two measures as indicators of business performance. The study used sales volume ratios as an agri-enterprise performance indicator due to its ability to produce similar results and performance patterns as other indicators such as profitability or ROI. Customer retention rate (CRR) was anticipated to form part of the performance indicator. However,

when grouped to form the performance variable, it was dropped due to a negative sign against the other two indicators: sales growth and employee productivity. Therefore, the study adopted two agri-enterprise performance indicators: sales volume or sales growth and employee productivity (EP) (it was transformed into log10 to minimise measurement biases that result from considerable value variation) as a non-financial indicator and a measure of efficiency and effectiveness in agri-enterprise operations that lead into performance and success (Arief *et al.*, 2013; Awang, *et al.*, 2009; Campos *et al*., 2017; Covin *et al.*, 2006; Mcgee & Peterson, 2017).

2.8 The effect of entrepreneurial orientation on agri-enterprise performance

Past studies have found that EO dimensions support enterprise growth; nevertheless, varying degrees are linked to using different performance measures (Fatoki, 2019; Rauch *et al.*, 2009; Vij & Bedi, 2012). The EO is one of the most recommendable strategic making processes for the survival and success of any agri-enterprise (Faiz & Ahmad, 2015). The EO scholars have focused on the EO-performance models to unveil the magnitude and direction of the relationship effect. The great opportunity offered by EO studies has aided the discovery of the EO impact on enterprises' performance, success, and capability to strive in a highly competitive environment. Agripreneurs continuous practice of innovative actions, proactive nature in running the enterprise, and readiness to tolerate risk is a great survival tactic used in sustaining competitive advantage in the operative environment (Aisyah *et al.*, 2017; Al-swidi & Al-hosam, 2012).

According to a study by Lee *et al.* (2018), a positive correlation between EO and business performance of the manufacturing enterprises construing that EO expansion amongst the MSMEs' proprietors is a receipt for their business growth and development. The future is uncertain; agri-enterprises must continually seek out new opportunities if there is a desire to achieve profits objectives. Entrepreneurs who adopt EO by continuous innovation, compelling well-calculated risks in product and service development, and acting proactively in their market strategies, are likely to achieve their set performance objectives and goals (Miller, 2011). The study by Wambugu *et al.* (2016) construed that only when top management of enterprises engage in innovative product and market strategies, invest in uncertain endeavours, and participate in proactive actions will enhance enterprise performance. Fairoz *et al.* (2010) and Fatoki (2012, 2019) suggested that enterprises that adopt high EO achieve higher scores on performance indicators than those with low EO. Likewise, Rauch *et al.* (2009) observed that businesses that adopt EO succeed more than

conservative orientated enterprises in the operative environment. Other studies by Otieno *et al.* (2012) and Shehu and Mahmood (2014) have shown a positive EO-performance relationship. The lack of empirical evidence showing the magnitude and direction of the EO dimension and agri-enterprise performance relationship limits the formulation of policies, strategies, and programs that support agri-enterprise development in Kenya, a critical research gap.

2.9 Gaps in the literature review

The high number of new and SMEs failure creates an enormous challenge in Kenya's economic development, thus calling for intensive research to unveil scientific solutions that can ensure business success, survival, and sustainability in the competitive environment. The EO is one of the most recommendable strategic making processes for the survival and success of any enterprise (Faiz & Ahmad, 2015). The EO actions and behaviour associated with enterprise performance differ from past studies that based their focus on tactical learning from mistakes performed in business undertaking and suggest a detailed acquaintance of the relationship between EO and the four critical aspects of strategic learning (Sirén *et al.,* 2017).

Business ventures that lack to express EO behaviour are likely to be phased out of the competitive market or fail to reap any profit from such rewarding opportunities (Hussain, 2015; Ogueze *et al.,* 2017). Past studies have collected sufficient evidence that applauds environmental turbulence creating an enabling environment for enterprises to thrive in advanced levels of EO, which are mediated by business management structures (Morris *et al.*, 2007). According to MSME (2016), business failure in agriculture stands at 37% in their first two years of operations. These high number of agri-enterprises failure can be associated to lack of EO implementation; Hence, the study intends to conceptualise the EO construct and draw its policy advantages and benefits in promoting agripreneurship development in Kenya by establishing the effect of EO on agri-enterprise performance.

Study by Covin and Wales (2012) revealed an EO assumption that enterprises fall in between a continuous variable that ranges from the conservative, the 'lowest end,' to an entrepreneurial level, which is the highest one. Also, Arzubiaga *et al.* (2017) pointed out that using a summated scale score to represent a latent construct can result in inconsistent structural estimates since the measures are all imperfect reflections of the underlying construct. However, despite the growing number of diverse approaches used to generate and define different EO levels, there is no consensus on the most appropriate approach to defining

the EO levels, hence, creating a critical research gap, which the study intends to develop a comprehensive approach to describe the existence of various EO levels among entrepreneurs.

Entrepreneurial oriented Past studies have reported a positive contribution of EO in the enterprise's superior performance attainment. However, there is a lack of empirical evidence on the importance of EO in the agri-enterprise performance context, which restricts the formulation of EO policies and strategies that can boost agripreneurship development in Kenya. This revelation is rare in agri-enterprise development literature as it is empirically evidenced in other enterprises from economic sectors such as financial, technology, manufacturing, and hospitality; hence, the study strives to fill this gap.

2.10 Theoretical framework

2.10.1 Institutional theory

The study embraced two theories: institutional and resource-based theory, as a framework for reference. The institutional theory under the entrepreneurship setting ascends when structured players with appropriate resources realise a valuable opportunity to seize in the operative environment, a situation described as institutional entrepreneurship (Biesenthal *et al*., 2018). Institutional actors mobilise resources to realise the value of their anxiety by altering the game rules by introducing a new game and transforming the rules and regulations of established structures to understand the new game. A great outlook on institutional entrepreneurship emphasises the creation of new business models, policies, and strategies to direct the flow of business operations. Among diverse business undertakings and domains, recognising business opportunities is a crucial renowned element in EO possession. Hence, agripreneurs' vision and persistence cannot be realised without institutional forces to enrich agri-enterprise survival and sustainability (Biesenthal *et al*., 2018).

Therefore, the institution's theory provides a basis that identifies the implication of networking, government interventions, and socio-economic factors in determining and shaping the trend of EO among agripreneurs (Covin & Miller, 2014; Wales, 2016). The institution in this perspective involves the 'rule of the game,' which administrates the social interchange undertaken by market actors. The theory concerns how enterprises adapt to their operative environment and manage their capabilities in their operating environment (Biesenthal *et al*., 2018). It transpires when businesses pursue socially accepted behaviours to bring authenticity satisfactory to all stakeholders. Moral ethics preserve an institutional environment as the critical determinant of internal business structure (Chao & Spillan, 2010). How agripreneurs structure their agri-enterprise affects the degree of EO inclination (Dess *et*

al., 2011). The theory plays a role in guaranteeing that factors under consideration reveal the determining influence on EO-AIS performance association.

2.10.2 Entrepreneurial orientation as a resource

In the current operative environment, agri-enterprises face intense competition, where maintaining and improving performance is an alarming problem (Lonial & Carter, 2015). For sustainability, agri-enterprises must successfully install both tangible and intangible resources that are unique, valuable, and difficult to copy in their strategic operations by rivals. The Resource-Based View (RBV) theory of the firm, as suggested by Barney (1991, 2001), emphasises that any enterprise operating in a competitive environment must use its physical, capital, and organizational assets. These resources facilitate an entrepreneur's ability to gain a first-mover advantage and sustained competitive advantage to achieve higher business performance. Therefore, the perspective gives rise to the understanding that agri-enterprises differ in resource endowment. Thus, performance heterogeneity leads to some agri-enterprises being ahead of others in terms of growth and performance while others lag or are eliminated from existence (Madsen, 2007).

Among various intangible assets that an agripreneur possesses, EO is discovered as an essential intangible asset. Agripreneurs who possess EO in their daily operations create a barrier for competitors to copy their strategic operations, leading to a sustainable competitive advantage. Therefore, EO facilitates agri-enterprise's actions and behaviour based upon early signals from its internal and external environments (Lumpkin & Dess, 1996).

The RBV expands the understanding of resource utilization and configuration to maximise and achieve the enterprise's performance goals and objectives. The theory argues that agri-enterprises that possess rare, valuable, and imitable assets have the potential to gain a sustained competitive advantage in an operative environment (Barney 1991, 2001). Hence, sustained performance guarantees AIS survival during the vulnerable early growth stage, where a higher number fail to survive in more than a year in operation. The EO actions and behaviours advocate an inclination toward innovative ideas such as creating new products or services, proactiveness actions, and risk-taking propensity that embodies a bold action-oriented position. In an ever-changing environment, only agripreneurs who can habitually establish and implement EO strategic assets and approaches faster and cheaper than their competitors can earn superior returns in the long run (Madsen, 2007).

2.11 Conceptual framework

The study adopted the conceptual framework that associates AIS performance with the influence of the owner's EO levels to achieve success. Due to the dynamic operative environment, farmers' demand for farm inputs in a particular season fluctuates, making some seasons off-peak. The existence of AISs, whose main activity in the agricultural value chain is to trade agri-inputs and services, has recoverable fixed costs across the seasons, which must be realised to ensure smooth business operation. Hence, EO strategies and approaches should be in place to ensure sustainability. Micro and small-scale AISs rely majorly on small-scale farmers as their primary source of market outlet for their salable agri-inputs and services. Under such a catastrophe environment, AIS significantly affects the overall business performance and market position, posing an elimination threat in the efficient market if EO actions and behaviours are not utilized. Under such a crisis, agripreneurs social factors, institutional factors, and AIS characteristics act as exogenous variables that combine to determine the EO levels that AIS owners possess, which in turn affect the AIS performance, determining whether the AISs survive or close their operations in the market as shown in Figure 1.

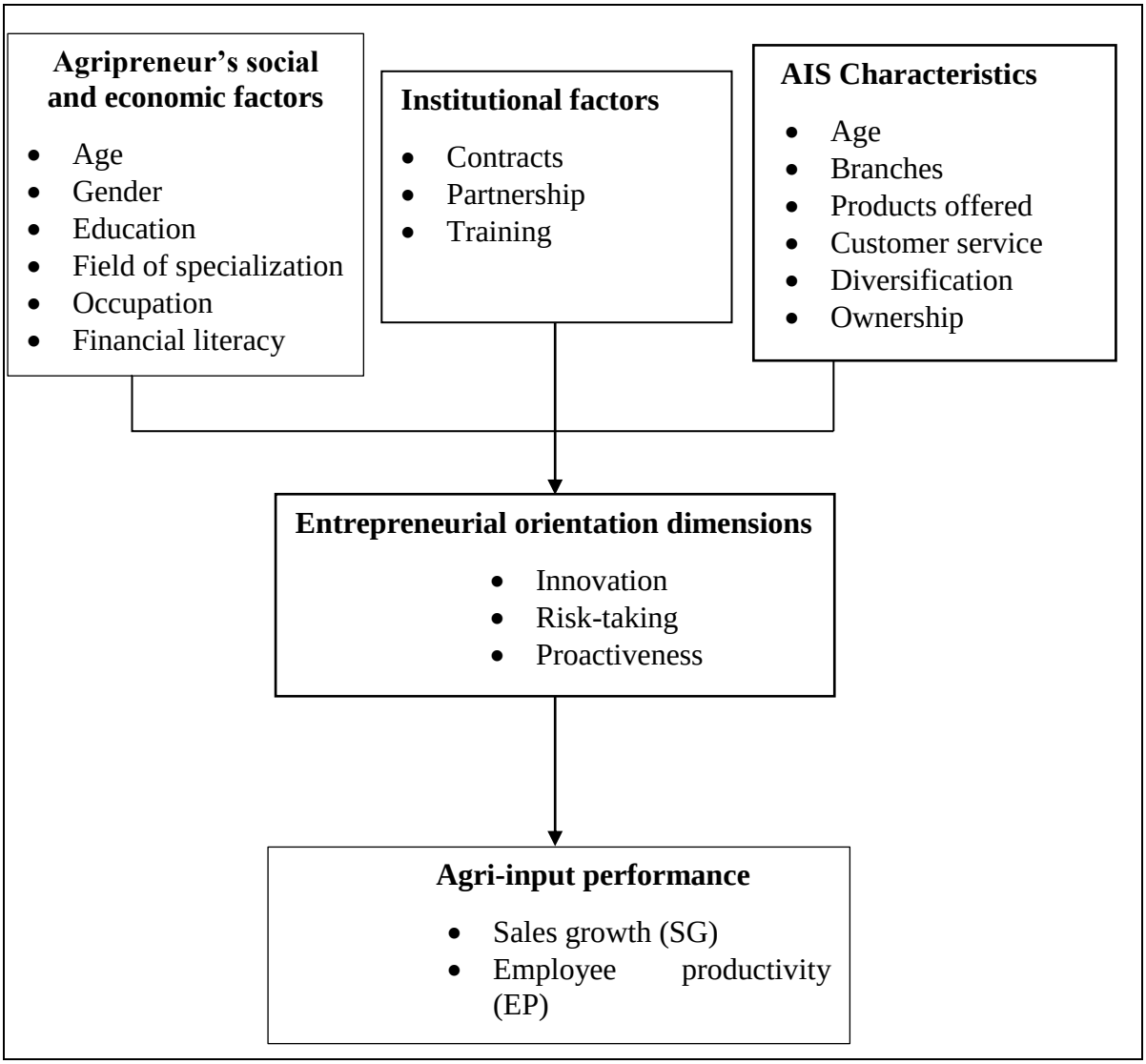

Figure 1. Conceptual framework

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This section introduces the mainstay of the study named methodology, which covers various aspects in chronological order answering the questions about where and how the resourceful primary data being utilised in the study was acquired. The chapter includes vital information on various features such as the area where the research was conducted, the method used to arrive at the study sample, how respondents were selected from the entire population and how data was captured from the sampled population. It also covers the section that describes how the primary data obtained was utilised and analysed to achieve the explicit objectives of the study.

3.2 The study area

The study was carried out in Nakuru County (county number 32) out of the forty-seven counties of the Republic of Kenya due to its agriculturally rich soils and climatic conditions that support livestock and crop production agri-enterprises. The County covers an area of 7,495.1 Km² and is located between Longitude 35º 28` and 35º 36` East and Latitude 0º 13` and 1º 10` South. The County has an estimated population of 1,077,272 men, 1,084,835 females, and 95 intersexes, totalling 2,162 202 persons from 616,046 households with an average of 3.5 persons per household (KNBS, 2020).

Nakuru county has a bimodal rainfall pattern which ranges from April to August (the long rains) and October to December (the short rains). The county enjoys 70% equivalent to 5,039.40 KM^2 of arable and highly reproductive land. Nakuru county was purposively selected due to its diverse agricultural activities undertaken by most small-scale farmers, which act as their main lifeline economic activity. The main agricultural core activities include agroforestry, livestock rearing for dairy and meat production, cash crop farming, aquaculture, apiculture, horticulture, and floriculture. Nakuru county is the primary livestock and crop producing county, mainly producing milk, maize, wheat, barley, beans, peas, vegetables, potatoes, pyrethrum, sunflower, and carrots that are locally consumed, sold to other counties, or exported to the international market (KNBS, 2015). Livestock and crops are mainly produced in Kuresoi, Bahati, Naivasha, Nakuru Municipality, Njoro, Molo, Olenguruone, and Gilgil. Due to these enormous agricultural activities in the county, many new, micro, and small-scale AISs are established to seize opportunities in the Agri input supply and value chains. The AISs market agri-input and services to the readily available

customers of the small-scale, medium, and large-scale farmers distributed all over the County. The County is divided into eleven administrative Sub-Counties: Naivasha, Gilgil, Nakuru East, Nakuru West, Rongai, Subukia, Njoro, Molo, Kuresoi South, and Kuresoi North.

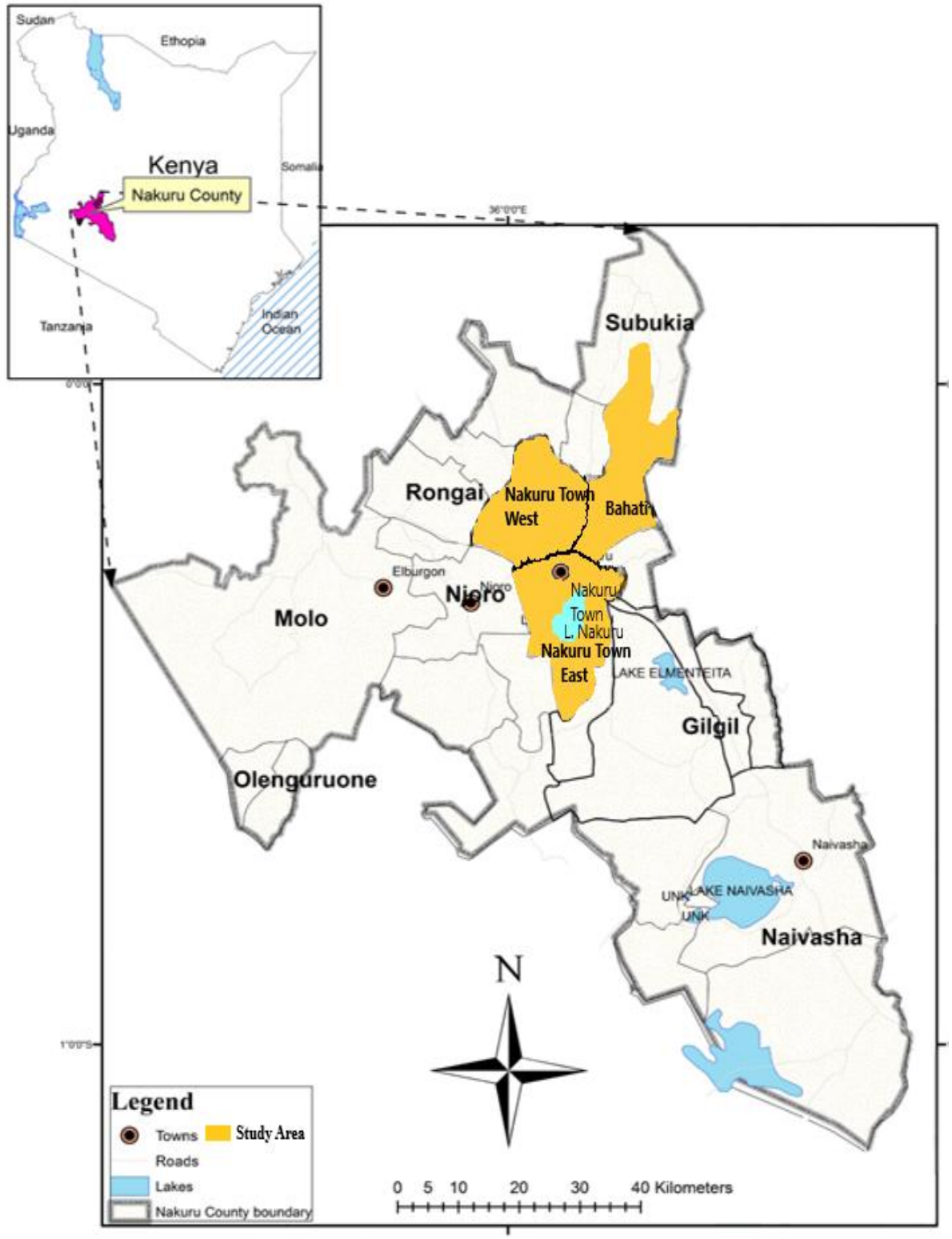

Figure 2**.** Map of Nakuru County (The study area)

Source: Regional Centre for Mapping of Resources for Development [RCMRD] (2018)

The study purposively selected three sub-counties: Nakuru East, Nakuru West, and Bahati, due to their high number of licensed AISs, which form 66% of the total licensed AIS in Nakuru county in the year 2018.

3.3 Sample size determination

The sample size was determined by Yamane's (1967) formula on finite population, which considers a normal distribution of the items of interest. The study assumed a 95% confidence level and selected an error limit of 7%, which is within the acceptable error level as recommended by Singh and Masuku (2014), that any error level below 10% is acceptable in obtaining the sample size from a finite population as shown in equation 3.1 and 3.2.

$$n_0 = \frac{N_0}{1 + N_0 e^2} \quad (3.1)$$

Where: n_0 represent the sample size

N_0 The population of the items of interest

e Error level

$$n_0 = \frac{416}{1 + 416(0.07)^2} = 136.9 \sim 137 \quad (3.2)$$

A sample of 137 AISs was formulated from a population of 416 AIS licensed for a single business permit by the County government of Nakuru during the year ended December 2018 to operate in Nakuru East, Nakuru West, and Bahati sub-counties (County Government of Nakuru [CGoN], 2018).

3.4 Sampling procedure

The list of licensed AIS was obtained from the licensing office, department of revenue collection, and County Government of Nakuru (CGoN, 2018). According to the county government of Nakuru business registration database of 2018, 626 AIS were licensed to trade agri-inputs and services in 2018. The study targeted AIS in operation for at least two years to measure AIS performance and growth. Three sub-counties: Bahati, Nakuru East, and Nakuru West were purposively selected due to their higher numbers of registered licensed AIS in operation (416 AISs representing 66 %). A simple random sampling technique was used to

select a sample of 137 from a list of 416 licensed AIS in the three sub-counties. This approach's primary benefit was giving each AIS an equal chance of being included in the sample. Each AIS was assigned a number ranging from 1 to 416. A sampling interval of 3 was used, which was obtained by dividing the population by the sample (416/137). The first AIS was assigned number 3 and selected as a starting point for the selection process; then, every third element was chosen until the sample of 137 was achieved. However, in cases of respondents estrange, disqualification, or closure of any sampled AIS, the neighbours were picked for replacement; for example, in case a sampled AIS number 21 had closed the operations before the data collection period, any AIS assigned number 19, 20, 22, and 23 that has been in operation at least for two years and willing to cooperate, replaced the sampled AIS. According to MSME (2016) report, about 78.9 per cent of the business were not registered by their respective counties, and only 1 per cent of agri-enterprises were registered; the justification why only 626 AIS were registered across the entire Nakuru county territory.

Table 1. Agri-input suppliers sample distribution in the three sub-counties

Sub-counties	**Population**	**Sample**
Bahati	131	43
Nakuru East	191	62
Nakuru West	94	32
Total	**416**	**137**

Source: Licensing office, County Government of Nakuru (2018)

3.5 Data collection

The study collected both primary and secondary data. The list of licensed AIS secondary information utilised was obtained from the licensing office of the County government of Nakuru (CGoN, 2018). The primary data was collected using the ODK version 22.4 data collection tool. The questionnaire (Appendix A) was uploaded to the device; then, the face-to-face interview was done by trained enumerators under the supervision of the chief investigator. Four enumerators were trained on the data collection tool and process to ensure quality data. A total of 137 respondents were interviewed between 26th May and 22th June 2019. Of the 137 respondents, their enterprises had been operating for at least two years. The choice for respondents was based on their comprehensive knowledge of the agri-enterprise characteristics, strategy, and performance, including EO adoption in their agri-input enterprises. The pilot study was conducted in Njoro sub-county with 10 AISs

to check the rationality of the questionnaire where necessary corrections were done, and actual primary data collection was instigated.

3.6 Data analysis

Primary data collected from the field was uploaded to the ODK google drive server daily. After completing the data collection process, the raw data was exported to an excel spreadsheet where data cleaning such as spell check and organization was conducted. The cleaned data was later imported in Stata software version 15 for further cleaning, value labelling, and other transformation in readiness for advanced data analysis. The study utilised the Stata software to describe key variable statistics, performed PCA (principal component analysis) to define the EO levels, and conducted a regression model to determine factors influencing EO levels. The SmartPLS software version 3.2.8 was used to assess how entrepreneurial orientation affects AIS performance.

3.6.1 Descriptive analysis

Entrepreneurial orientation levels were created by grouping total EO scores derived using the PCA regression method into three equal levels from lowest to highest: conservative, moderate, and entrepreneurial, generated by a quantile technique internally generated by PCA post-estimation method. Out of the 137 respondents, the conservative level had 46 agripreneurs representing the group with the lowest values of EO scores; the moderate had 46 respondents representing the central cluster with average values of EO scores. Finally, the entrepreneurial set represented by 45 respondents with entrepreneurial levels had the highest values of EO scores.

Based on the identified levels, the agripreneurs' age, years of schooling, and the agri-input suppliers' years of operation means and standard deviations (SD) were assessed using the one-way analysis of variance (ANOVA) technique, and the overall F-value for variable significance test. The agripreneur's gender, field of specialization, principal occupation, and financial literacy was described using one-way ANOVA technique frequencies and t-test statistics for significant assessment of the social-economic factors across the three EO levels generated. Agri-input supplier's characteristics: number of persons owning the AIS, the number of outlets, diversified businesses activities, selling nature, type of products offered, and the existence of AIS customer care section was descriptively analysed using one-way ANOVA frequencies, and variables significance was pursued using t-test statistics across the three generated EO levels. Institutional factors: agripreneur's number of training attended,

number of contracts engaged, and number of partners' arrangement engaged was described using one-way ANOVA to generate the frequencies and t-test statistics for significance test.

3.6.2 Determination of the entrepreneurial orientation levels

Table 3 presents the 14 statements adopted from prior studies and consistently used in the past studies to assess the individual inclination toward EO reflected from innovation, proactiveness, and risk-taking dimensions as discussed in chapter two, section 2.2. A 5-point Likert scale was used as a rating scale for the adopted statements. Adopting a 5-point Likert scale other than the 7, 9, or 11-point Likert scale minimizes time and effort to respond to the statements. Similarly, various researchers indicate that the 5-point Likert range is as worthy as any different Likert-scale rating since using 7, 9, or 11 Likert scales does not increase the reliability or accuracy of the assessments (Fakhrul & Ayadurai, 2011).

The 14 observable item statements were first subjected to internal reliability tests to test their unidimensionality of the EO construct using Cronbach's Alpha. The 0.7 threshold value was established to assess if the stated 14 items were within the range to measure the EO construct. The 0.7 value has consistently been used in past studies as the reliability benchmarking value scale (Lotz & Merwe, 2013; Mwai *et al.,* 2018; Warmbrod, 2014). Likewise, a validity test was conducted to examine the internal consistency of the 14 statements adopted to assess the EO disposition. Kaiser-Meyer-Olkin (KMO), a sample adequacy test, was calculated to reveal the internal consistency of the 14 statements before performing the principal component analysis (PCA). The KMO was introduced by Kaiser (1974), who recommended a set of uniquely categorised threshold values, as shown in Table 2, to evaluate the variable internal consistency. The study adopted the Rather and Sharma (2017) recommendation of a KMO threshold value of 0.8 to quantify the sample adequacy before progression to conduct the PCA procedure. The KMO also examines the adequacy of the sample size for assessing the measurement model.

Table 2. The KMO threshold values

The KMO values	**Acceptability level of correlation**
Below 0.5	Unacceptable
0.5-0.59	Miserable
0.6-0.69	Average
0.7-0.79	Adequate
0.8-0.89	Commendable
0.90 and above	Excellent

The KMO is a measure to quantify the degree of correlations among the variables that indicate the proportion of variance in the study variables that might be caused by the principal latent components (Mooi *et al.,* 2018; Wambugu *et al.,* 2016).

After data reliability and sample adequacy tests, PCA was performed on the 14 EO statements. The PCA is a statistical reduction method that analysed the interrelationships amongst the 14 reliable variables to explain them in terms of their standard underlying latent components. According to Hair *et al.* (2013), the primary purpose of choosing PCA is its capability to identify and group critical observable items associated with individual components. The PCA produced 14 components; however, only five were retained using eigenvalue and scree plot criteria for having greater than one, and they explained 68% of the total variance of the EO latent construct, with an assumption that the other 32% is an error variance as a postulation made in the adoption of reflective EO construct model. The PCA was followed by orthogonal varimax rotation that produces independent solutions by generating weights on the five components retained using eigenvalue criteria that optimally accounts for variation among the 14 experimental parameters (Odum, 2011). Individual factor scores for each element were predicted using a regression score computation method, a post-estimation PCA command in Stata.

The choice of extraction, rotation and factor score computation methods dramatically influence the quality of the factor scores obtained. The Grice (2001) study recommended the evaluation of the indeterminacy problem for factor scores before subsequent statistical analysis. The study selected PCA and orthogonal varimax rotation to minimise indeterminacy problems because uncorrelated components were generated. The orthogonal rotation is the superior rotation method; it minimises the variances of the factor loadings within the components while maximizing differences between high and low loadings on a particular component. The PCA is chosen over the other extraction methods due to its ability to create unique solutions with individual component scores. It also produces identical results even when different component score approaches are used, thus minimizing the dispersion of scores obtained on a particular component.

The study by Distefano and Mîndril (2009) classified two methods used in calculating factor scores as non-refined and refined methods. According to Distefano and Mîndril (2009), non-refined methods use simple calculating techniques that are easy to work out and interpret component scores such as sum scores by components, sum scores-above cut-off value, sum scores-standardised variables, and weighted sum scores. Even though non-refined factor score methods are stable, simple to calculate, and easy to interpret, they face two problems

that affect their measurement reliability and accuracy: first, they lack computation of mean and standard deviation for each component score. Secondly, they produce correlated component scores even when orthogonal solutions are utilised.

In the estimation of the EO scores, which is a reflective construct from its dimensions, two standard refined methods can be used: regression scores and Bartlett score, through prediction; a post estimation Stata PCA command, to cater for non-refined inadequacies (Distefano & Mîndril, 2009; Odum, 2011). These methods use standardised information to create component scores. Bartlett's component score method produces a univocal and unbiased estimate of the correct factor scores (Distefano & Mîndril, 2009). Univocal scores mean each observed variable is only expressed through one component score. While unbiased means any repeated sample could yield an accurate estimate of corresponding parameter scores. The regression method obtains a score by minimising the sum square deviation of the components from their actual values and are shrunk towards zero, which is the variable mean. The scores obtained have a zero mean and a variance equivalent to the squared multiple correlations between projected and accurate component scores (Distefano & Mîndril, 2009). The PCA technique maximises the relationship between the two scores meaning that even if other orthogonal rotations like varimax can still generate correlated component scores. Using components instead of variables in computing scores overcomes the collinearity problems that may affect the subsequent analysis. The two advanced methods typically give rise to nearly similar scores highly correlated with factor scoring.

The study predicted scores for each component using the regression method resulting in negative and positive sign values based on whether the responses had higher or low values on EO measured statements, as shown in Equation 3.3. Scores from each retained component were summated to form the EO overall scores, as shown in Equation 3.4.

$$\hat{F}_{ci} = \hat{\Phi}\hat{\lambda}' \Sigma^{-1}\left(\hat{\theta}\right)\left(y_i - \hat{\mu}\right) \tag{3.3}$$

$$F_{c1} + F_{c2} + F_{c3} + F_{c4} + F_{c5} = TotalEOscores \tag{3.4}$$

Where F_c is the predicted individual component score for the i observation, and the hatted matrices on the right side of the equation are the matrices of the maximum likelihood estimations (MLE) that generate model parameter scores? The model gives prior distribution

$F \sim n\left(\theta, \hat{\Phi}\right)$. With the assumption of multivariate normality, data from previous i observations are being used to predict the subsequent component scores.

Table 3. Statements used to assess the entrepreneurial orientation levels

Code	Variable description	Measurement of variable	Expected sign
ao1	I have introduced several new or significantly improved agricultural products or services in the past two years in my agri-input supply enterprise.	5-Likert	+
ao2	I have introduced new or significantly improved distribution methods in my AIS for the last two years.	5-Likert	+
ao3	During the last two years, I have introduced new or significantly improved marketing channels and strategies in my agri-input supply marketing operations.	5-Likert	+
ao4	During the last two years, we have established new or significantly improved supporting activities for the business operation and processes.	5-Likert	+
ao5	My business has a corporate culture that allows adaptation to innovative ideas, technologies, methods, and goals.	5-Likert	+
ao6	In dealing with competitors, I typically initiate actions that competitors respond to.	5-Likert	+
ao7	I am the first to introduce new products, services, techniques, and technology in our industry or market.	5-Likert	+
ao8	When dealing with competitors, I always establish a competitive position and vigorously exploit the opportunity to achieve higher performance.	5-Likert	+
ao9	I continuously try to anticipate my customers' future needs and wants and strategise to meet them.	5-Likert	+
ao10	I strongly prefer high-risk initiatives with chances of very high returns.	5-Likert	+
ao11	Under uncertain situations, I always adopt an aggressive posture that maximises the probability of exploiting potential opportunities.	5-Likert	+
ao12	I have in place a risk management process or process	5-Likert	+

Code	Variable description	Measurement of variable	Expected sign
ao13	I am not afraid to invest money in risky projects.	5-Likert	+
ao14	I strongly prefer high-risk initiatives with chances of very high returns.	5-Likert	+

The total EO scores were then arranged ascendingly and equally grouped into three levels from the lowest to the highest labelled: conservative (low level with significant negative scores), average (middle-level scores oscillating around zero scores), and entrepreneurial (high level with positive scores) using three quantile procedure internally generated by PCA post estimation Stata command.

3.6.3 Factors influencing the entrepreneurial orientation levels

The levels of EO identified: conservative, moderate, and entrepreneurial, form an ordinal variable outcome. The study holds that EO estimates the owner's intensity of innovativeness, proactiveness, and risk-taking in their business undertaking. The EO levels reflected the entrepreneurial position of the enterprise and were assigned 1, 2, and 3 values to represent conservative, moderate, and entrepreneurial oriented, respectively, as shown in Table 5. The study presumed that when entrepreneurial-oriented agripreneurs operate an AIS, they will optimise the employment of the three identified EO dimensions in pursuit of success in the AIS operations.

When outcome variables are ordinal, ordinary least square (OLS) technique, the commonly used regression model cannot be utilised because it requires an interval or ration outcome that assumes linear functions estimations. Therefore, it can no longer produce the best linear unbiased estimates (BLUE); thus, OLS is a biased and insufficient model for ordinal outcomes (Williams, 2016). Consequently, researchers have developed various regression models for categorical variables, such as multinomial regression; however, due to the nonlinearity of the absolute outcomes models, it is difficult to fit the model and interpret the results. Table 4 presents the ordered outcome models such as ordered logit, also known as the proportional odds model (POM), ordered probit, and generalised logit, which can be used to analyse the ordinal dependent outcomes (Williams, 2016). The models utilise the MLE matrix that requires a probability distribution function assumption such as logistic assumptions or complementary log-log functions (Park, 2009).

Table 4. Summary of regressions models

Nature of dependent variable	Models	Estimation used
Interval/ratio	OLS regression	Moment Based Method
Binary response	Binary logit,	MLE
	Binary probit	
Ordinal response	Ordered logit	MLE
	Generalised logit	
	Ordered probit	
Nominal Response	Multinomial logit	MLE
	Conditional logit	
	Nested logit	
	Multinomial probit	
Event count data	Negative binomial	MLE
	zero-inflated	
	zero-truncated	

The main difference between ordered logit and ordered probit is on the error term assumption, where the latter assumes standard normal distribution $\left(\phi(\varepsilon) = \frac{1}{\sqrt{2\pi}} \ell^{-\frac{\varepsilon^2}{2}} \right)$ and a variance of 1, and the former implies the standard logistic distribution with a mean of 0 and a variation of $\frac{\pi^2}{3}, \lambda(\varepsilon) = \frac{\ell^{\varepsilon}}{(1+\ell^{\varepsilon})^2}$. Choosing between ordered logit and probit is centred on estimation and familiarity rather than interpretation (Williams, 2016). However, the logit model reaches convergence better than probit; nevertheless, probit, on the other side, works well with the bivariate model than logit. Ordered logistic regression is a suitable model to determine the influence of predictor variables on an ordinal outcome that allows parameters estimation of the independent variables on their impact on ordinal outcomes.

Econometric models that handle non-linear functional prefer either the probit model or logit due to their ability to adapt non-constant error variance in a normal cumulative distribution to define latent utility (*). A multivariate model, by extension, has four or more outcomes of dependent variables, whereas a bivariate has two consequences. In the case of the above two outcomes, it is feasible and accurate to use an ordered logistic regression model to evaluate a tri-variate normal cumulative distribution (Greene & Hensher, 2010).

When estimating the model where outcome variables are ordinal, observed variables of Y are collapsed into underlying variable Y* for this study; the underlying latent variables are the EO levels: conservative, moderate, and entrepreneurial orientation. Whereas agripreneurs' social and economic factors, institutional factors as well as agri-enterprises characteristics form the explanatory variables to prompt their influence on the constructed EO levels. Due to the nature of the dependent variable, only ordered regression techniques can be utilised since they allow the estimations of the effects and magnitude of independent variables in consideration of the underlying Y* (Williams, 2016). However, the underlying assumption of ordered logistic or probit regression is a single coefficient generated between pair of outcome groups, resulting in one set of coefficients.

In executing both ordered logit and probit models, parallel regression or proportional odd assumption is always made (the constant coefficients across the categories); however, such an assumption is often violated. (Williams, 2016). That is, ordered logistic regression assumes coefficients designated for the relationship between, say, the conservative and moderate level are the same as those that describe the relationship between the medium and the entrepreneurial level (parallel line or proportional odds assumption). Therefore, using the ordered logistic or probit regression model in analysing multiple ordered outcomes yields erratic and biased estimators when the distribution is indefinite (Johnston *et al.*, 2019). This assumption is always violated in practice, hence, creating a misleading impression that independent variables always relates equally across all levels which may not be true. Thus, it is expected that $\beta's$ for various independent variables may differ across ordinal outcomes, which is not the case with parallel-line models, due to its restrictive nature. Hence, the ordered logit/probit fails to reflect the real and true nature of the influence of the exogenous variable on dependent ordinal outcomes. Therefore, the generalised ordered logit (GOL) model, the superior alternative model, was considered in the study due to its flexibility and aptitude to give substantive results to accommodate such inadequacies of ordered logit models.

The generalized ordered logit model, also referred to as the partial proportional odds model (PPO), gives analysis results where some coefficients might be the same across the categories, while other coefficients may have different coefficients with different signs and magnitude. The GOL analysis gives a substantive insight that would have been missed if data had been analysed using the proportional odds models. The Wald test was conducted (Appendix I), its results disapproved the argument of parallel regression assumption, where

the variable 'occupation' violated the parallel assumption. The rejection of the parallel assumption necessitated the utilisation of (GOL) model which is better off than the former due to its ability to put up both the odd/parallel line model and partial proportional odds model using a series of binary logistic regression estimations. These characteristics empower the GOL model to estimate less restrictive variables better than ordered logit (which violates the parallel assumption). It also provides more interpretable and parsimonious estimates than multinomial logistic estimates that ignore the implication of ordered information. According to Williams (2016), the GOL model is formulated as follows:

$$P(Y_i > j) = g(X_i\beta_j) = \frac{Exp(\alpha_j + X_i\beta_j)}{Exp(\alpha_j + X_i\beta_j)}, \quad j = 1,2.....C-1 \tag{3.5}$$

Where C = is the number of categories of the Y^* latent variable, when C=2, the model is treated as a binary logistic regression model; however, when C>2, the GOL model becomes similar to a series of binary logistic regression for example in the case of EO levels where $C=3$, $j=2$, therefore, j=1 category is compared with $j=2$ one. Parallel-line models are similar to partial proportional odds models. However, their main difference is that parallel-line models have similar values of $\beta's$ for j, whereas, in partial proportional odds models, coefficients are provided for each j and can be equal to all values of j, while other coefficients differ. Partial proportional odds models thus, overcome the parallel-line model's shortfalls; besides, they add other features that make model estimations easier and more powerful (Williams, 2016). Stata software was considered and utilised for the GOL model analysis over the other analytical software such as SAS, R, SPSS, and LIMDER due to its ability to have individual commands as well as allowing the user to perform post estimation analysis such as marginal effects, discrete changes in a modest way.

Table 5. Variables used in analysing the factors influencing entrepreneurial orientation levels

Code	**Variable description**	**Measurement of variable**	**Expected sign**
	Depended variable		
EOL	Entrepreneurial orientation levels	1-Conservative 2-Moderate 3-Entrepreneurial	+/-

Code	Variable description	Measurement of variable	Expected sign
	Independent variables		
Age	Respondent's years of age	Number of years	+/-
Gen	Gender of the respondent	0-Female 1-Male	+/-
Educ	Years spent in formal education	Number of years	+/-
Occ	The main occupation of the owner/operation	1-Business person 2-Salaried 3-Casual labourer	+/-
Exp	Years of active business operation	Number of years	+/-
Train	Number of training engage in the past two years	Number of pieces of training	+/-
Contr	Number of contractual agreements	Number of contracts	+/-

	Independent variables		
partn	Number of business partners	Number of partners/owners	+/-
Oper	Years enterprise has been in operation	Number of years	+/-
emp	Number of permanent and casual employees	Number of employees	+/-
Brch	Number of branches operating in other locations	Number of branches	+/-
B_plan	Own and use a business plan	0-No 1-Yes	+/-
Diver	Do you engage in other business lines apart from agri-inputs	0-No 1-Yes	+/-
Sell	Business selling nature	1-Retail 2-Wholesale	+/-
Prd	Products traded	1-one product line 2-Two product line 3-Three product line 4-More than three	+/-

3.6.4 The effect of entrepreneurial orientation on agri-input suppliers' performance.

The study investigated the causal relationship's effect, magnitude, and direction between entrepreneurial orientation and agri-enterprise-performance. The five retained components to reflect EO dimensions first investigated their impact on AIS performance. Secondly, three levels were generated: conservative, moderate, and entrepreneurial; as replication of EO, their effect on AIS performance was further revealed, as shown in Table 6. The AIS performance indicators: employee productivity and sales growth formed the dependent outcome.

The hierarchical regression model (HRM) is operationalised so that independent variables are entered in the regression equation sequentially. The HRM examines whether the higher-order interactions account for a significant difference in the total explained variance (Anderson & Eshima, 2013; Rauch *et al.,* 2009). In each step of the hierarchical analysis, an additional higher order of interaction evaluates the change of R^2 and *F*-statistics to test the significance level. An interaction effect exists if the interacting term yields a significant contribution over and above the direct impact of the independent variables.

However, when executing the HRM model, its estimates lack the control effect of the latent variables in the model. Due to its structure and estimates are mainly perceived as a comparison tool rather than a statistical model (Hair *et al.*, 2013). Partial least squared, a structural equation modelling (PLS-SEM) technique, was used instead. The PLS-SEM is a causal modelling approach that maximises the explained variance of the latent constructs (Hair *et al.*, 2013). The exploratory study with the non-normality issue, PLS-SEM, was used to accommodate HRM insufficiencies. The analysis was reported based on the approaches suggested by Hair *et al.* (2013) which includes the execution of indicator reliability, internal consistency reliability, convergent validity, discriminant validity, average variance extracted (AVE), effect size, path coefficient estimates, and predictive relevance.

The PLS-SEM is a causal-predictive analysis method that estimates partial model structures by combining PCA with OLS regressions (Hair *et al.,* 2013). The model does not impose rigid population, distribution, or scale measurement assumptions. It is more robust, with fewer restrictions placed on the unbiased sample size estimate, and can handle statistical analysis for formative and reflective indicators (Fatoki, 2019). The PLS-SEM technique using a component-based approach is advantageous due to its complex structural equation models with more than 50 items (Venturini & Mehmetoglu, 2019). The model is suitable for theory development (new variables added to the theory) rather than theory testing. Unlike

other casual modelling techniques, the model does not need substantial sample sizes and can be ideal for prediction (Fatoki, 2019).

The Smart PLS 3.2.8 software was used to determine the effects of entrepreneurial orientation on AIS performance. The PLS-SEM is a stand-alone commercial software supported by a community of scholars centered at the University of Hamburg (Germany), School of Business (Hair *et al.*, 2013). It represents the most popular and comprehensive software implementation of the PLS-SEM methodology. The model specification was performed by drawing the structural model for the latent variables by assigning the indicators to the latent variables through an easy-to-use graphical user interface (GUI). The SmartPLS provides state-of-the-art partial least square techniques for fitting PLS-SEM models, including bootstrapping and nonlinear relationships (Hair *et al.*, 2013). Both observed and unobserved heterogeneity can be accounted for using several approaches, such as finite mixture segmentation. Interaction effects of mediation and moderation analysis can also be executed as well as hierarchical component models (second-order models) for fitting more complex structural models (Venturini & Mehmetoglu, 2019).

The PLS-SEM estimation procedures: According to Venturini and Mehmetoglu (2019), PLS-SEM estimation procedures consist of three sequential stages: in stage one, the model estimates the latent variable scores, where they are iteratively estimated for each step and initialized for each latent variable score. The model then evaluates and approximates the inner and outer loading of the latent variable scores and finally tests the convergence. Step two builds the measurement models where parameter weights and loadings are estimated. The final stage constructs the structural model path coefficients.

The study utilised PLS-SEM because of its flexibility in exhibiting reflective and formative constructs, accounting for latent measurement errors, and assessing structural model significance. The R^2 values, size, and sign of path coefficient evaluated the structural model. As determined by the t-statistics, the estimated stability was attained from a bootstrap test with 500 resamples. The *t*-test statistics from the bootstrapping process defined statistically significant associations (Wambugu *et al.*, 2016).

Model measurement estimation entails the specification of the relationship between latent variables and their manifest items, implicating the focus on the impact of the individual component (George & Marino, 2011; Venturini & Mehmetoglu, 2019). The PLS-SEM assessed composite reliability (CR) and AVE to define single component reliability, discriminant validity, and internal consistency (Hair *et al.*, 2013). As previously stated, five components retained were labelled: innovation, creativity, proactiveness, strategic, and risk-

taking to reflect the EO inclination and assumed to exist unidimensionality. Two financial performance indicators, sales growth and log of employee productivity (transformed into logarithms to minimise variance and outliers), revealed the agri-enterprise performance. All the variables were measured with an assumption of measurement error.

Agri-enterprise performance indicators: sales growth (SG) Sales information was captured by first apportioning the two seasons agripreneurs experience in their agri-input transaction, peak and off-peak seasons. Peak season is mainly experienced during planting and harvesting seasons characterised by plentiful agricultural activities. On the other hand, off-peak seasons are experienced when targeted customers, primarily farmers, anticipate field harvest. After the harvesting period of farm crops, farming activities tend to decline; however, other agricultural activities continue, such as livestock production, horticulture, and floriculture. Hence, the purchase of inputs befalls throughout the year, with a fluctuating level of agri-inputs and services demands. According to MSME (2016), about 90 percent of agri-enterprises are new start-ups, five years old and below. The agricultural sector in Nakuru county is, therefore, majorly composed of start-up enterprises, the reason why the study adopted 2-years which is the minimum number of years that can be adapted to calculate the business growth. The two years were selected to have a sufficient number of AIS that meets the minimum threshold of being in operation for at least two years, licensed to operate in Nakuru county, and trades agri-inputs or services.

Average sales were obtained from the AIS's books of accounting as revealed by the respondent; after that, the sales growth was calculated using the formula:

$$SG = \left[\frac{NetSales\,2018 - NetSales\,2017}{NetSales\,2017} \right] 100 \tag{3.6}$$

The ratios obtained formed the business growth ratio in terms of sales, positive ratio indicated the AIS performed better in the year 2018 than the 2017 performance, while the negative sales growth ratio reflected the inferior status of agri-enterprise performance in the current time than the previous one.

Employee productivity (EP) is an efficient approach to enterprise performance evaluation. It shows an enterprise's efficiency and profitability through the optimal utilization of employed workers to generate desired sales and profit. It is one of the best performance comparison tools for enterprises in a similar industry. The EP was transformed into logarithms to minimise variation and outliers effect.

It was calculated using the formula shown in Equation 3.7

$$EP = \left[\frac{Sales}{Number\ employees} \right] \quad (3.7)$$

The structural model is the structural part of the PLS-SEM that shows the latent variable relationship direction. The EO forms the exogenous section of the PLS-SEM structures, whereas the AIS performance denotes the endogenous or outcome variable. The latent variables relationship is derived by path coefficients (β) defining the relationship magnitude and direction between the exogenous and the endogenous latent variables.

Table 6. Variables used to assess the effect of entrepreneurial orientation on agri-input suppliers' performance

Code	**Variable description**	**Measurement of variable**	**Expected sign**
	Depended variables		
EP	Employee productivity	Sales/Number of employees	+/-
SG	Sale growth	(Net sales (2018)-Net sale (2017))/Net sales (2017)	+/-
	Independent variables		
EO	Entrepreneurial orientation components	1-Comp1 (Innovation) 2-Comp2 (Proactiveness) 3-Comp3-(Risk-taking) 4-Comp4 (Creativity) 5-Comp5 (Strategies)	+/-
	Entrepreneurial orientation levels	1-Conservative 2-Moderate 3-Entrepreneurial	+/-

CHAPTER FOUR
RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter entails statistical results and discussion on descriptive statistics of agripreneurs' attributes, agri-enterprise characteristics and institutional networking, determinants of EO levels, factors influencing EO levels generated, and the effect of entrepreneurial orientation on AIS performance.

4.2 Descriptive statistics

1.2.1 Agripreneurs' characteristics

The study identified years of schooling, gender, financial knowledge, and the possession of a business plan as agripreneurs' attributes showing significant differences across the three generated EO levels, as shown in Tables 7 and 8, respectively. The study found a significant difference in the AIS owner/operator's year of schooling with EO levels advancement; the conservative level had a mean of 14.0870 years, moderate 14.5870 years, and the entrepreneurial level 15.4889 years. The findings confirm the importance of education evolution as a driving force in acquiring entrepreneurial orientation levels. The advancement in the academic ladder is associated with a higher likelihood of agripreneurial orientation. Such findings agree with previous studies by Ambad and Damit (2016) and Kurniawan *et al.* (2019), who also found a positive impact of entrepreneurial education on entrepreneurial orientation.

The agripreneur's gender attribute is essential in ascribing to EO possession. Approximately 43% of the sampled AIS decision-makers were female, while about 57% were male. Female agripreneurs showed a higher percentage of moderately oriented at about 43%, while only 22% were entrepreneurially oriented, and roughly 35% were conservatively oriented. On the other hand, almost 43% of male agripreneurs interviewed were entrepreneurially oriented, around 32% were conservatively oriented, and only 26% were moderately oriented. The study revealed a higher concentration of female agripreneurs in the moderate orientation category, whereas male colleagues were intense in entrepreneurial orientation class, as shown in Table 8.

Table 7. Description of age and years of schooling on levels of entrepreneurial orientation

Variables	Total EO		Conservative level		Moderate level		Total EO		F-test	Prob> F
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Age	37.6277	12.4481	38.5435	14.1071	36.0435	10.4157	38.3111	12.6685	4.0661	0.5719
Education	14.7153	2.1691	14.0870	2.2689	14.5870	1.6941	15.4889	2.3024	4.9252***	0.0069
AIS age	8.8696	6.9366	7.6304	6.2052	9.0889	7.1090	8.5255	6.7400	0.9062	0.5399

Table 8. Description of agripreneur's characteristics on EO levels

Variables	Description	Conservatism	Moderate level	Entrepreneurial	Total	Pearson chi2	Pr
Gender	Female	35%	43%	22%	44%	7.1533**	0.028
	Male	32%	26%	42%	56%		
Specialization	NONE	48%	30%	22%	20%	7.7643	0.256
	Veterinary	24%	30%	46%	34%		
	Agriculture	30.5%	39%	30.5%	26%		
	Agriculture Non	39%	36%	25%	20%		
Occupation	AIS operation	34%	36%	30%	84%	4.2218	0.121
Main	Other occupation	32%	18%	50%	16%		
Financial	No	86%	0	14%	5%	9.2229***	0.010
Analysis	Yes	31%	35%	34%	95%		
Business	No	56%	32%	12%	31%	17.8394***	0.000
Plan	Yes	23%	34%	43%	69%		

Note: * significant at 1% level; ** significant at 5%, level sample = 137**

In their study concerning gender reporting behaviour, Schneider *et al.* (2012) observed a significant difference in answering a particular aspect between women and men. Females act as introverts when reporting on various economic and social elements adjoining themselves, whereas males behave as extroverts since they give final answers due to their viability; the study reported such observations where about 42% of men against 22% of females exhibited an entrepreneurial alignment. In contrast, roughly 43% of women and around 26% of men displayed a moderated entrepreneurial orientation, and only 35% of females and 32% of menfolk fall under the conservative orientation category.

Financial-related knowledge possessed by the business owner play an important role in implementing entrepreneurial orientation actions. The financial expertise utilised by AIS decision-makers showed a significant difference across the three EO levels. Approximately 95% of agripreneurs interviewed confirmed their financial knowledge and used financial statements, ratios, and other relevant financial information to make AIS informed financial decisions. About 31% of financially knowledgeable agripreneurs fall under the conservative orientation level, 35% under the moderate level, and 34% under entrepreneurial orientation. The estimated 86% of agripreneurs who never used financial information in decision-making were conservatively oriented, confirming that financial literacy contributes to entrepreneurial orientation, as shown in Table 8. These findings were in agreement with Purnomo's (2019) observation that revealed a positive influence of financial literacy on the general performance of an innovative enterprise.

An agripreneur possessing a business plan as a management blueprint showed a significant difference through the three EO categories. Approximately 69% of the agripreneurs owned a written business plan and followed the stipulated strategies in their business operations. About 43% of them fall under the entrepreneurial orientation category, 34% under moderate orientation, and around 23% conservatism. Nearly 31% of agripreneurs interviewed had no tangible business outline. Out of the agripreneurs who did not have a business, about 56% were conservatism, 32% moderate, and 12% were entrepreneurial, as shown in Table 8. The study recognises the role of possessing a business plan, a strategic blueprint guiding financial and management decisions. The study findings agree with Barbieri and Mshenga's (2008) revelation that possessing an immediate business plan and marketing strategies improves the performance of agritourism farms, an indication of EO inclination. Studies by Vaznyte and Andries (2019) also pointed out the efficacy of business plan development in start-ups' financial strategies.

4.2.2 Agri-enterprise's features

The study identified the number of agri-enterprise branches, marketing strategies: trading nature (retail, wholesaling), and the variety of products and services offered as the critical AIS characteristics that are significantly different across the generated entrepreneurial orientation levels proclivity, as shown in Table 9. The number of outlets an agri-input supplier had significantly differed across the three generated EO levels. Nearby 68% of the sampled AIS operated only a single *agrovet*, whereas around 32% had between one and five branches. The study revealed a progressive trend towards entrepreneurial orientation with an increase in the number of branches. An estimated 40% of the AISs without a branch were categorised as conservatively oriented, against roughly 26% considered entrepreneurially oriented. On the other hand, 48% of those with branches were entrepreneurially oriented, and only 20% were conservatism, as shown in Table 9. The study by Nguyen-Van and Chang (2019) reported similar findings with multinational corporations that transfer innovative technologies and entrepreneurial activities to local subsidiaries to boost their research, development, and growth.

The study identified two marketing strategies undertaken by sampled AISs: retail (56%) and a combination of retail and wholesaling (around 44%), which showed a significant difference across the created EO levels. Approximately 43% of retailers were conservatism against 22% entrepreneurial oriented; however, 47% of wholesalers who retailed were also entrepreneurially oriented against 22% who fall under the conservatism category, as shown in Table 9. The study confirms the need to create innovative marketing processes and strategies to survive the turbulent operative environment by applying higher levels of entrepreneurial behaviour (Ogueze *et al.*, 2017).

Various regulatory authorities have established rules and regulations on operations and transactions of AIS in Kenya. The established rules and regulations determine the type of crop inputs, animal health products, and services exchanged by the AIS operators based on their academic qualifications. Various products and services sold significantly differ between the EO levels. At least 9% of AIS traded only one range of products, 55% provided two mixtures, and roughly 36% provided three types of products.

Table 9. Description of agri-input supply characteristics on entrepreneurial orientation levels

Variables	Description	Conservative level	Moderate level	Entrepreneurial level	Total	Pearson chi2	Pr
Branches	No	40%	34%	26%	68%	7.7532**	0.021
	Yes	20%	32%	48%	32%		
Ownership	Sole	31.2%	34.4%	34.4%	68%	5.5693	0.695
	Two persons	38%	30%	32%	25%		
	Three persons	25%	50%	25%	6%		
	More than 3	100%	0%	0%	1%		
Diversification	No	32.4%	33.3%	34.3%	74.5%	0.4467	0.800
	Yes	37%	34%	29%	25.5%		
Selling-Nature	Retail	43%	35%	22%	56%	10.8332***	0.004
	Retail & wholesaling	22%	32%	46%	44%		
Products offered	One product	46%	38%	16%	9%	14.8278***	0.005
	Two variety	43%	33%	24%	55%		
	Three variety	16%	33%	51%	36%		
Customer care	No	52%	19%	29%	15%	4.3092	0.116
	Yes	30%	36%	34%	85%		

Note: * significant at 1% level; ** significant at 5% level, sample = 137.**

The estimated 46% of the one-product trading AISs were conservatism, and only 15% were entrepreneurially oriented. For two-products trading AISs, around 43% were conservatism, nearly 33% were moderately oriented, and only 24% were entrepreneurialism. Of the three-products trading AIS, about 16% of them were conservatism, and nearly 51% were commercially oriented (Table 9). The study's findings on these marketing strategies are similar to that of Jain and Ali (2013) and Genc *et al.* (2019) findings that there is a need for agripreneur's commitment to understanding customers' needs to create innovative products and marketing processes that satisfy consumers to outdo their competitors.

4.2.3 Institutional networks

The study considered partnership, training, and contracts as the fundamental institutional factors that shape the EO, which showed a significant difference across the three generated EO levels (Table 10). Training refers to the number of entrepreneurship teaching and coaching an agripreneur attended in the past two years under consideration (2017-2018). On the other hand, contracts refer to the number of current predetermined arrangements made with customers, while the partnership is the number of other allies engaged in AIS operations such as agro-processors, academic institutions, government institutions, or NGOs.

For training attendees, nearly 22% were conservatism, and almost 38% were entrepreneurial oriented, whereas, for agripreneurs who never attended any training, around 45% were conservatism while approximately 28% were entrepreneurial oriented (Table 10). The findings confirm the entrepreneurial orientation progression as a result of entrepreneurship training facilitation. Of the AISs with contracts arrangement, approximately 24% of them were conservatism, and about 44% were entrepreneurialism, whereas an AIS with no contract engagement, around 45% were conservatively oriented, whereas only 19% of them were entrepreneurial oriented. An AIS with an existing partnership engagement, virtually 14% of them were conservative, while around 58% of them were entrepreneurially oriented; on the other hand, AISs without any partnership agreement, almost 43% of them were conservatives, and only 21% of them were entrepreneurial oriented as shown in Table 10. The findings reveal the importance of institutional networks in tapping agri-enterprise opportunities through using EO as an agri-enterprise essential resource.

The study results on institutional networks are similar to Mohamad and Chin's (2019) findings that institutional business networking significantly positively affects entrepreneurs' entrepreneurial behaviour and enterprise sustainability. Their results demonstrate that agripreneurs' institutional network facilitates access to information and other vital resources

that increase their agri-enterprise performance. The possession of secure institutional systems increases the probability that agripreneur become more entrepreneurial-oriented, resulting in agri-enterprise performance and success.

Table 10. Description of institutional factors on entrepreneurial orientation levels

Variable	Description	Lowest Level	Middle level	Highest Level	Total	Pearson chi2	Pr
Training	No	45%	27.5%	27.5%	50%	8.0385**	0.018
	Yes	22%	40%	38%	50%		
Contract	No	45%	35%	20%	45%	10.9257***	0.004
	Yes	24%	32%	44%	55%		
Partners	No	43%	36%	20%	69%	19.9929***	0.000
	Yes	14%	28%	58%	31%		

Note: * significant at 1% level; **significant at 5% level, sample = 137.**

4.3 Determination of entrepreneurial orientation levels

The study used 14 statements evaluated by a 5-Likert scale to assess the agripreneurs' entrepreneurial orientation. The research carried out an exploratory factor analysis (EFA) using PCA as the factor reduction process. However, before PCA execution, a data reliability test using Cronbach's alpha and sample adequacy test using KMO was conducted, yielding a recommendable result that allows the progression of PCA (Table 11).

4.3.1 Reliability and validity tests

Before performing PCA, the study conducted a preliminary check analysis: reliability and validity tests. Cronbach alpha, a reliability test, was navigated to define the internal uniformity of the 14 measured items employed to reflect entrepreneurial orientation, the latent variable under consideration. All the adopted 14 items adopted to measure the EO, their reliability was verified to reveal whether they genuinely quantify the entrepreneurial orientation. As shown in Table 11, all identified 14 items to assess the EO had Cronbach alpha values above the threshold value of 0.7 with an overall value of 0.8314, showing strong reliability of the items in the reflection of the latent variable EO.

KMO statistics, also known as the measure of sampling adequacy, was performed to determine the EO latent variable sufficient correlation. The 14 manifest variables measured had KMO values lie between 0.75-0.9, with an overall mean of 0.8127 presenting a commendable level of correlation, recommending progression with PCA procedure.

Table 11. Reliability and validity test results

Item.	Label	Alpha	KMO
ao1	I have introduced several new or significantly improved agricultural products or offering services in the past two years in my agri-input supply enterprise	0.8252	0.7923
ao2	During the last two years, I have introduced new or significantly improved distribution methods for inputs, products, or services in my agri-input supply enterprise.	0.8234	0.8300
ao3	Have you introduced new or significantly improved marketing channels and strategies in my agri-input supply marketing operations during the last two years?	0.8149	0.8463
ao4	During the last two years, I have established new or significantly improved supporting activities for the business operation and processes, such as maintenance and operations systems for purchasing, accounting, or digitalization.	0.8160	0.8220
ao5	I have been trying new ways of doing things and solving problems in my business management practices.	0.8235	0.8033
ao6	My business has a corporate culture that allows adaptation to innovative ideas, technologies, methods, and goals.	0.8213	0.8000
ao7	In dealing with competitors, I typically initiate actions that competitors respond to in my business operations.	0.8215	0.7620
ao8	Regularly, being the first to introduce new products, services, techniques, and technology in our industry or market?	0.8220	0.7857

Item	Label	Alpha	KMO
ao9	When dealing with competitors, I always establish a competitive position and vigorously exploit the opportunity to achieve higher performance.	0.8148	0.9093
ao10	I continuously try to anticipate my customers' future needs and wants and strategise to meet them.	0.8274	0.7585
ao11	I strongly prefer high-risk initiatives with chances of very high returns.	0.8156	0.7884
ao12	Under uncertain situations, I always adopt an aggressive posture that maximises the probability of exploiting potential opportunities.	0.8255	0.8628
ao13	I have in place a risk management process or process	0.8208	0.7723
ao14	I'm not afraid to invest money in risky projects.	0.8208	0.8180
	Overall	**0.8314**	**0.8127**

Note: Cronbach's alpha threshold > 0.70 and KMO > 0.70

4.3.2 Factor extraction and retention

The primary purpose of PCA is to replicate an information arrangement with fewer components (Mooi *et al.*, 2018). The PCA process computed eigenvectors, where the maximum variance was extracted from all the 14 components. After the execution of PCA, the Kaiser criterion and scree plot offered guidance on the number of components to retain. The Kaiser criterion kept all five elements, which had an eigenvalue above one, as shown in Table 12. The scree plot was another approach used in deciding the number of components to retain by plotting component eigenvalues (*y-axis*) beside the associated components in (*x-axis*), as shown in appendix G. Both methods approved the retention of five components to be used for further analysis of component solutions.

Table 12. The results of principal components' eigenvalues

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	**5.2160**	3.3909	0.3260	0.3260
Comp2	**1.8251**	0.3174	0.1141	0.4401
Comp3	**1.5076**	0.2257	0.0942	0.5343
Comp4	**1.2819**	0.2753	0.0801	0.6144
Comp5	**1.0066**	0.1094	0.0629	0.6773
Comp6	0.8972	0.0778	0.0561	0.7334
Comp7	0.8194	0.1003	0.0512	0.7846
Comp8	0.7191	0.0774	0.0449	0.8296
Comp9	0.6417	0.1370	0.0401	0.8697
Comp10	0.5055	0.0233	0.0316	0.9013
Comp11	0.4822	0.0850	0.0301	0.9314
Comp12	0.3972	0.0132	0.0248	0.9562
Comp13	0.3841	0.0678	0.0240	0.9802
Comp14	0.3163	0.3163	0.0198	1.0000

4.3.3 Components rotation

Component varimax rotation was conducted to attach each 14 EO statements on the five components retained using each statement's highest component loading criterion across the five components. The rotation created the relationship that determines which among the five components, each of the 14 EO statement relates to a particular EO component. The component rotation goal is to alternate the component matrix that utilises a simple configuration for a more natural interpretation. Each variable was assigned to a particular component with the highest absolute component loading. According to Mooi *et al.* (2018), if the extraction process retains one or two components, only a variable with a component loading above 0.5 is considered. However, if components retained are above three, lower loading above 0.3 is acceptable. The negative sign of the component loadings was ignored when assigning the EO statements on a particular component, as shown in Appendices 4 and 5, respectively.

4.3.4 Components score computation

After orthogonal rotation of the retained five components, component scores, a linear combination of variables was calculated using the regression technique, a post estimation prediction of the Stata PCA procedure. Scores were generated for each component retained and were labelled: innovation, risk-taking, proactiveness, strategic, and creative. The scores were generated for each respondent and component. The predicted component scores for each element were summated to obtain the total EO score for each respondent.

After score computation, the quantile technique, an internal generating Stata command, was used to distribute 137 sample respondents based on their total EO scores into three equal categories representing individual EO situations as shown in Table 13. The three levels generated were labelled: Conservative (the lowest level characterised by negative score values) and moderate (the middle level representing agripreneurs who oscillate around the mean 0, symbolizing moderate orientation. The highest level was identified as entrepreneurial orientation, comprising of individuals who have the highest total component scores at least above the mean. The entrepreneurial level shows a high inclination toward entrepreneurial orientation actions and behaviours. Table 13 gives the total score range for the three generated EO levels. The results confirm similar findings from Covid and Wales (2012) that business entrepreneurial orientation levels fall from an array of a continuous variable that ranges from lowest to highest.

Table 13. Entrepreneurial orientation generated levels

Levels	Entrepreneurial orientation total score range		Frequency
	Lower limit	Upper limit	
Conservative	-16.3412	-0.9825	46
Moderate	-0.8649	2.2437	46
Entrepreneurial	2.3355	9.8882	45

4.4 Determination of factors influencing the entrepreneurial orientation levels

The three EO categories generated: conservative, moderate, and entrepreneurial orientation, form an ordinal outcome, labelled one to represent the lowest level, two the middle, and three the upper level. The study identified variables: gender, age, products traded, business plan, ownership, contracts, and partnership as explanatory variables that influenced agri-enterprise's level of EO by use of generalised ordered logistic regression model (Table 14).

As discussed in section 3.6.3, The GOL model accommodates the ordered logit inadequacies. The GOL models hold that the coefficients of exogenous variables may be the same across all levels, or others may differ. It represents an estimate of the partial proportional odds (PPO) model. Three levels generated in Table 13 devised two categories for genealised regression analysis, where conservative-moderate created the first range and moderate-entrepreneurial levels created the second choice. Therefore, positive coefficients show that higher values on the explanatory variable make it more likely that the respondent will be in a higher category of Y* (EO levels) than the current one. In contrast, negative coefficients specify that higher values on the independent variable intensify the probability of being in the present or a lower range (Williams, 2016).

The GOL model results indicated that seven out of fourteen factors significantly influenced either a single or the two EO ranges created (Table 4). Products offered by the AIS, ownership of the business plan, and the number of partners and contracts significantly influenced EO levels. Gender differences showed significant influence on the higher level of EO. On the other hand, years of operation negatively influenced both EO levels, and AIS ownership negatively influenced the lower EO levels. This study approves the Williams (2016) revelation that using GOL models and the exogenous coefficient may differ across ranges, such as occupation, gender, and enterprise ownership.

Table 14. Analytical results were generated using the GOL model for EO levels.

Variable	1st Range of levels coef.	2nd Range of levels coef.	1st z	2nd z	1st P-Value	2nd P-Value
Age	0.0095	-0.0010	0.35	-0.04	0.693	0.971
Gender (Male)	0.0760	**1.2963****	0.15	2.33	0.882	0.020
Education	-0.0148	0.1570	-0.11	0.96	0.914	0.339
Occupation	0.6161	-0.3171	0.85	-0.41	0.398	0.685
Diversification	0.3428	0.5845	0.62	0.98	0.535	0.327
Business age	**-.0.0969***	**-0.1494*****	-1.87	-2.88	0.061	0.004
Business plan	**1.0817****	**1.2038***	1.97	1.80	0.049	0.079
Branches	0.4158	0.3217	0.77	0.38	0.442	0.706
Ownership	**-0.6915****	-0.4136	-2.28	-1.08	0.023	0.282
Selling nature	0.3728	0.3217	0.63	0.53	0.525	0.597
Products offered	**1.2355*****	**1.1230****	2.92	2.50	0,003	0.013
Training	0.0751	0.0472	0.77	0.56	0.439	0.518
Contracts	**0.1734*****	**0.1500*****	2.85	2.95	0.004	0.003
Partnership	**1.2756***	**1.0403***	1.93	1.81	0.053	0.071

Note: * means significance at 10%, ** at 5%, and *** at 1%, sample = 137**.**

The type of **products or services offered** by the AIS showed a powerful significant influence on EO levels. It was clear that most AIS traded at least two types of agri-inputs and services, except 9% representing animal feed manufacturers selling only one variety of agricultural products, that is, animal feeds (Table 9).

The variety of agri-inputs and services offered by AIS in Nakuru County showed the most substantial positive significant influence on both EO ranges created at coefficients (1.2355 $p<0.01$ and 1.1230 $p<0.05$) (Table 14). The results imply that when the AIS offers more product/service lines, their EO levels increase by 1.2355 and 1.1230 to achieve the highest EO level. The findings can be explained by the fact that dealing with various products and services is an expression of a solid commitment to implementing innovation, especially if the product lines are new or the improvement of the existing ones. Selling varieties of products can also be perceived as a proactive action as it entails providing new or improved products and services that suitably meet consumers' needs and expectations by exploiting new opportunities provided by the market. Marketing various products and services can also

be considered a risk-taking behaviour because agripreneurs are willing to compel considerable resources to various product/service lines in a competitive environment. Trading varieties of products and services is an expression of higher EO levels as reflected by the innovation, proactiveness and risk-taking EO dimensions' behaviours and practises. This finding is similar to Jain and Ali (2013) and Genc *et al.* (2019). They concluded that there is a need for agripreneurs to commit to understanding customers' needs and introducing new innovative products/services and marketing processes that proactively satisfy consumers' needs to outdo their competitors.

Most AIS who traded a combination of animal health products and services and crop inputs and services were more entrepreneurial-oriented than those who offered fewer product lines. Therefore, to ensure sustainability of AIS operations, agripreneurs must innovatively and proactively offer as many diverse products and services as possible to serve all customers' agri-input needs under one roof to spur agri-input supply growth in Nakuru County, Kenya.

Ideally, most AIS operating in Nakuru County (69%) **own a business plan** blueprint that guides their agri-enterprise activities and goals to be achieved (Table 9). Owning an AIS business plan showed a strong positive influence on the EO levels at (1.0817 $p<0.05$ and 1.2013 $p<0.1$) (Table 14). The finding implies that possessing a business plan increases agripreneur's EO levels from the lower EO range characterised by rare expression of innovative, proactive and risk-taking behaviour and practices to the higher EO range characterised by robust EO dimensions actions and practises by 1.0817 and 1.2013, respectively. Ownership of business plans permits tracking AIS's innovative, proactive, and risk-taking actions and processes, thus increasing their EO levels (Vaznyte & Andries, 2019). Agripreneurs who fail to develop and utilise business plans exhibit conservative behaviour revealed by diminished EO levels due to a lack of a guiding framework that can track innovative, proactive, and risk-taking activities that informs business action and direction. The study findings conform to those of Barbieri and Mshenga (2008) and Vaznyte and Andries (2019), who concluded that possessing a business plan improves financial management efficiency, an indication of higher EO level inclination.

In light of the above observation, agripreneurs need to be sensitised to develop a business plan if they do not have one or revise the existing one to ensure the business dynamics are fully addressed and the right actions are timely taken in order to guarantee

sustained growth and performance of the AIS whether new or established in Nakuru County, Kenya.

Establishing **agri-input suppliers' partnership with** agri-input supply chain actors was not a typical institutional arrangement made by most AIS in Nakuru County, Kenya. About 69% of the AISs lacked any form of partnership in the agri-input supply chain. Only 26% had between 1 and 5 partners, with only 5% having more than five partners (Table 10). The number of partnerships significantly positively influenced both EO levels (Table 4). The partnership showed a strong positive effect on EO levels explained by coefficients (1.2756 $p<0.1$ and 1.0403 $p<0.1$). The results infer that an additional agri-input supply chain actor in AIS operations engagement enhances higher EO levels by 0.12756 and 1.0403, respectively.

Supply chain partners create a conducive environment for the AIS to thrive by sharing essential resources such as knowledge acquisition and marketing strategies that aid in implementing innovative, proactive, and risk-taking strategies, surpassing competitors who may lack any partnership arrangement (Jiang *et al.,* 2016). The findings can be explained by the fact that partners enhance the market establishment of new products, services, and marketing processes through sharing limited resources among the partnering organisations. They also ensure a reliable supply of agri-inputs and mitigate risks associated with new products, services, techniques, and technologies since any risk can be shared among the partners. Conversely, a lack of partnerships decreases the EO levels by the corresponding proportions. Therefore, AIS must be encouraged to build inter-partner relationships with other firms within the supply chain to facilitate a higher EO level that guarantees the successful development of AIS in Nakuru County, Kenya.

Possession of **AISs' contracts** showed a positive influence on EO levels. However, it was clear that most AISs lacked contractual arrangements with customers in their business operations. The results can be ascertained by 45% of AISs who did not have any form of contract with customers to supply them with any agri-input or service; 21% had between 1 and 5 contracts, with only 34% having more than five contracts (Table 10). The AISs' contract arrangement with customers showed a weak positive significant influence on EO levels as explained by coefficients (0.1734 $p<0.01$ and 0.1500 $p<0.01$). The results imply that any additional agri-input supply contract undertaken enhances agripreneurs' EO level from a lower level to a higher one by 0.1734 and 0.1500, respectively. The findings can be explained by the fact that contractual arrangements ensure sustained working capital of the contracted AIS in the event of agricultural shocks such as drought characterised by minimal agricultural

activities and sales. Thus, contract agreements ensure a consistent supply of products and services (Torkkeli *et al.,* 2019). When AISs' are entrepreneurial-oriented, they engage in contracts as innovative marketing strategies that ensure continuous cash flows even when competitors who lack contracts struggle to meet their operational costs.

Participation in contract arrangements guarantees AIS survival and growth into an established medium or large-scale AIS due to the assurance market of their trading products or services. In contrast, a lack of contract engagements hinders AIS from reaping contractual benefits associated with low EO levels proclivity (Thongsri & Chang, 2019; Torkkeli *et al.,* 2019). Higher EO levels emphasise the importance of institutional networks such as contracts in assisting AISs to acquire essential resources such as entrepreneurial skills and information. Therefore, possessing business contracts is imperative for AISs' higher EO level proclivity resulting in a higher survival rate and performance. The practice of ownership of business contracts should be prioritised by agripreneurs running AIS, training them about the benefits of business contracts in their business operations. Contracts necessitate sharing of risky outcomes associated with agricultural shocks, hence, enhancing AISs' survival and sustainable growth in Nakuru County, Kenya

The **gender differences** substantially influenced the higher range of EO levels (Table 14). The gender aspect showed a significant favourable influence on the higher range of the EO levels (1.2963 $p<0.05$) but an insignificant influence on the lower range of EO levels (Table 14). The results revealed an increase of 1.2963 of EO levels in favour of the AIS run by male operators. The outcomes can be explained by the fact that male agripreneurs are more extrinsically motivated to become entrepreneurial-oriented, whereas females are intrinsically motivated to become EO (Pejić Bach *et al.,* 2016). The results revealed a significant difference between male and female AIS operators in achieving higher EO levels. The variance can be linked to the Kenyan society's perception of entrepreneurship as a masculine domain.

The male perspective of entrepreneurship negatively affects AIS female operators and owners in their efforts to achieve higher EO levels and business success, as they perceive their male counterparts as key decision makers and more entrepreneurial oriented. Decision-making plays an essential role in determining the higher EO levels among AIS in Nakuru county; hence, AISs' daily business operation decisions are made by males tend to be more entrepreneurial oriented than those operated by female counterparts. The result was achieved after selecting men compared to females during the GOL model analysis (Table 14). The findings of this survey support past studies' findings on the influence of gender differences

on EO (Pejić Bach *et al.*, 2016). The recommendation is to incorporate the gender aspect when recruiting employees to ensure entrepreneurial power bestowed on the gender orientation is nurtured to address gender equality and promote the prosperity of the AIS business in Kenya.

Agri-input supplier's years of operation: Most AISs' operating in Nakuru county are start-ups; 36% have existed in less than five years (Table 7). Only 35% of AIS had been operating between 5-10 years, and 29% for more than ten years. The significant negative influence of years of AIS operations was revealed by coefficients (-0.0969 $p<0.1$ and -0.1494 $p<0.05$) in both lower and higher EO levels (Table 14). The result implies that as AIS matures, its levels of EO decline from being entrepreneurially oriented to being conservative by 0.0969, and 0.1494, respectively. The result can be explained by the fact that as AIS grows over time, reaching a maturity stage; its EO characteristics decline because most of its new ideas generated during their early stages have been implemented, hence, operating on a status quo that lacks innovation, proactiveness, and risk-taking behaviour, hence diminishing EO levels (Table 14).

New and start-up AISs lack sufficient tangible resources such as capital; therefore, they must engage in innovation, proactiveness, and risk-taking actions and behaviour to survive the competitive environment that has already established AISs rule. However, as they grow and become fully established, their EO activities decline since they have exhausted all sustainable, innovative paths. The study finding agrees with Anderson and Eshima (2013), who found out that young firms possess intangible resource advantages that help them exhibit the most robust levels of growth at their early stages than their old foils, revealing their higher levels of EO inclination. Therefore, AIS must engage in more entrepreneurial behaviours and actions during their early years of establishment in order to ensure sustained growth in their maturity stage.

Most Agri-input suppliers were solely owned (68%) (Table 9). The AIS ownership showed a significant negative influence (-0.6915 $p<0.05$) on the lower range of EO levels generated (Table 14). The result implies that adding a new partner into the AIS co-ownership decreases their chances of realising higher EO levels by 0.6915. Conversely, when AIS is already exhibiting higher levels of innovation, proactiveness, risk-taking actions, and behaviours, adding a partner does not influence their EO level. The findings can be explained by the fact that the new partner may have EO behaviour different from existing owners (Mwai *et al.*, 2018). The results may hinder the AIS capability for robust decision-making on several EO activities that may need speedy actions to be undertaken in order to achieve the

desired higher EO levels (Dess *et al.*, 2011). This finding is similar to those of Dess *et al.* (2011) and Mwai *et al.* (2018), whose studies concluded that firm ownership affects the degree of agripreneur's EO disposition.

4.5 Effect of entrepreneurial orientation on agri-input supplier's performance

The study generated three EO levels from the execution of the quantile technique on total EO scores obtained from the aggregation of five retained components and was labelled: innovation, risk-taking, proactiveness, creativity, and strategic orientation. The two AIS performance indicators: sales growth and employee productivity, were used to evaluate AIS performance. The PLS-SEM model was used to determine entrepreneurial orientation's direction and magnitude effect on AIS performance.

4.5.1 The measurement model design

The measurement concept is traced back from the reliability test conducted on the 14 items adopted from prior studies as the core manifest items for determining entrepreneurial orientation. The 14 manifest items had an alpha value above 0.7 (Table 11), confirming the reliability test. The PCA, a reduction method, was conducted. Five components were retained using the eigenvalue and scree plot criteria to represent the components/dimensions that reflected the EO and were labelled: innovation, proactiveness, risk-taking, creativity, and strategic. After components retention and score prediction, the quantile technique was used to group different responses based on their EO scores into three categories from lowest to highest and was labelled: conservative, moderate, and entrepreneurial levels.

The five EO components retained and three EO levels generated formed the reflective construct of EO that was used as the latent explanatory variables with their effect sought against AIS performance as the latent dependent variable. The PLS-SEM calculated convergent and discriminant validity. When using PLS-SEM, it is recommended to use composite reliability (CR) values instead of Cronbach's alpha coefficients; as suggested by Hair *et al.* (2013), a CR of 0.70 is set as the threshold value. The study's CR values were 0.817 for EO components, 0.707 for EO levels, and 0.763 for AIS performance, indicating acceptable reliability in executing PLS-SEM analysis. Average variance extract (AVE) was further calculated to evaluate the convergent validity, whereas Hair *et al.* (2013) recommended an AVE threshold value of 0.50. The study's latent variable AVE value was 0.574 for EO indicators and 0.503 for AIS performance. Subsequently, all variables had AVE above the 0.5 thresholds, signifying the convergent validity suitability for PLS-SEM execution.

4.5.2 The effects of entrepreneurial orientation on agri-input supply performance

Table 15 presents the PLS-SEM results showing a positive coefficient of 0.440 and 0.480 significant at a 1% confidence level between entrepreneurial orientation and AIS performance (β= (0.440,0.480) p<0.001). The results were achieved when the five retained components were used as the observable variable to reflect the EO construct. The positive β=0.440 infer that every one-unit change in EO increases AIS performance by 0.440 units of sales growth and employee productivity. The R^2 coefficient value of 0.228 specified that 22.8% of the deviation in AIS performance could be associated with entrepreneurial orientation actions and behaviours.

The *t*-statistics tested the significance of entrepreneurial orientation relationship with the agri-enterprise performance, where critical *t*-statistics values should be higher than 1.96 at a 0.001 significance level. The resulting *t*-test statistics for the EO component's relations with AIS performance were significant at the 0.001 significance level for a two-tailed test with *t*= 7.533 (Table 15).

Table 15. Results of the effect of entrepreneurial orientation on AIS performance.

Relation	**Original sample**	**Sample mean**	**Standard deviation**	***t*-test**	**-value**
EO components -AIS Performance	0.440	0.465	0.117	7.533***	0.000
EO levels-AIS Performance	0.481	0.470	0.094	2.540***	0.011

Note: * means significance at 1%**

The study further subjected generated EO levels as the observable items to reflect entrepreneurial orientation into structural models showing the causal relation with the AIS performance. The study found a positive coefficient of 0.481 between EO levels and AIS performance relationships at a 1% significance level (β=0.481, p<0.011), as shown in Table 15. The coefficient implied that each 1-unit in a change in EO levels increases AIS performance by 0.481 units of sales growth and employee productivity. The study found an R^2 of 0.232 value for the path coefficient, revealing that a 23.2% AIS performance variation can be accounted for by EO actions and behaviours.

The empirical results illustrated in Table 15 demonstrate that EO reflects innovation, proactiveness, and risk-taking as a significant positive relationship with AIS performance. Hence, concluding agripreneurial orientation affects agri-enterprise performance in the

agricultural sector environment in Kenya. The study findings and conclusion agreed with past research findings conducted in other economics sectors that found a positive relationship between EO and enterprise performance. Studies by Otieno *et al.* (2012) and Wambugu *et al.* (2016) conducted in Kenya also found a significant positive association between entrepreneurial orientation and firm performance in manufacturing and processing firms in Kenya. Other studies by Al-Swidi and Al-Hosam (2012), Amin (2015), Hair *et al.* (2019), and Murni (2017) also found a significant favourable influence of entrepreneurial orientation on organizational performance across different economic sectors. The study by Mahmood and Hanafi (2013) also found a significant positive relationship between entrepreneurial orientation and the business performance of women-owned SMEs in Malaysia. Similarly, the study results concur with that of Shehu and Mahmood (2014) on the influence of EO and business environment on enterprise performance in Nigeria using a PLS-SEM approach, found a positive and direct relation between entrepreneurial orientation and business performance. The study had a similar conclusion as that of Fatoki (2019), who concluded that green entrepreneurial orientation positively influences the sustainability performance of firms in the hospitality industry.

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

i. The study generated three EO levels: conservatism, moderate, and entrepreneurial oriented. Grouping of responses was grounded on their total scores calculated from retained components. Extreme negative EO scores showed individual conservatism on entrepreneurial orientation actions and behaviours. Moderate level enclosed respondents with medium EO inclination. The entrepreneurial level signifies entrepreneurial embracers who actively practice innovative, proactive, and risk-taking actions in their daily business operations, with higher total EO score values.

ii. The study identified key attributes that have critical inspiration for agripreneurs EO disposition. Start-ups and small AIS operating in Nakuru county should strategise on how to possess a business blueprint and increase their product lines, several contracts, and partnership engagement. They must also consider gender differences in business operations to capture unique EO emanated from gender orientation. The number of owners must be minimised while operating during their growth stage if achieving higher EO levels associated with business success and performance is their goal. These aspects identified in the study to have a significant influence on EO ought to be keenly looked into by various stakeholders delegated to develop agripreneurship in Kenya as well as implementers of the county's strategic development blueprints in consideration of agripreneurship.

iii. The study examination of entrepreneurial orientation effect on agri-enterprise performance using the PLS-SEM technique established a significant positive effect between the EO construct and AIS performance. Entrepreneurs in all economic development sectors should consider the entrepreneurial orientation concept as a driving force for enterprise sustainability by integrating EO actions and behaviours in their daily operations. The study found that entrepreneurial orientation as a reflective, uni-dimensional construct is an essential forecaster of agri-enterprise performance regarding sales growth and employee productivity. Critical stakeholders required to develop agripreneurship in Kenya should embrace the EO concept due to its positive effects on AIS performance. The study concludes that it is only when the agripreneurs engage in innovative product marketing, participate in risky projects and be the first initiator of proactive actions that they can experience success and witness their

business performance, as well as ensure sustainability of their enterprises in a competitive agribusiness environment.

5.2 Recommendations

i. Entrepreneurship promoters train agripreneurs with inadequate resource endowments to prioritise innovative activities, proactiveness behaviour by anticipating future customer needs, strategising to meet them before their competitors, and engaging in moderate and well-calculated risk-taking actions in order to secure and guaranteed performance at their vulnerable growth stage.

ii. Designers of agripreneurship policies and programs in Kenya should consider developing and incorporating an entrepreneurial orientation framework that recognises innovation, proactiveness, and risk-taking as essential aspects in agripreneurship development in Kenya, which are currently overlooked.

iii. The study recommends that entrepreneurs implement EO accomplishments that enhance enterprise performance.

5.3 Suggestions for further research direction

i. The study adopted Miller's (1983) three dimensions' model presented as a reflective construct using fourteen items selected from various studies. Further research may consider incorporating moderating or mediating environmental factors in the EO model.

ii. Further study may consider integrating the formative construct approach and considering Lumpkin and Dess's (1996) five dimensions' model.

iii. An experimental learning study can be conducted to assess entrepreneurial orientation as a reflection of intellectual manifestation beyond entrepreneurial intention or action.

iv. Need for replication of Campos *et al.* (2017) experimental research in agripreneurial context; by training agripreneurs on implementing innovative, proactive, and risk-taking actions and behaviour that showed significant improvement in business profits.

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APPENDICES

Appendix A. Survey questionnaire

Introduction

My name is Daniel Munyoki Musyoka, a student at Egerton University, currently pursuing a Master's degree in Agri-Enterprise Development of Egerton University. This research questionnaire is developed and issued to you to collect information for examining **"The Effect of Entrepreneurial Orientation on agri-enterprise performance, focusing on Agricultural Input Suppliers in Nakuru County."** Your response to this questionnaire is strictly confidential. Your name or that of your agri-enterprise will not appear in any stage of research analysis and report writing. Research findings can be made available if desire so.

Thank you for your contribution and support for the study.

Q 1. Do you consider yourself as the key decision-maker for this AIS? If "yes" proceed with the interview,

		Questionnaire No.	
Enumerator's Name		**Date.**	
County		**Respondent's Name.**	
Sub-County		**Mobile No.**	
Ward			

Codes for questions 1.1 to 1.8

	Code A			**Code C**			**Code D**			**Code E**			**Code F**			**Code H**
1	Yes		**1**	Formal		1.	KVB		1	Strongly Disagree		1	Very Poor		1	Very Cheap
0	No		**2**	Informal		2.	Business permit		1.	Disagree		2	Poor		2	Cheap
						3.	PCPB		2.	Neutral		3	Satisfactory		3	Reasonably
	Code B					4.	KEPHIS		3.	Agree		4	Good		4	Expensive
1	Retail					5.	KEBS		4.	Strongly Agree		5	Excellent		5	Very Expensive
2	Wholesaling															

1.0 Social characteristics

This section contains items regarding the critical decision maker's personal information, AIS characteristics; please respond to each piece with an answer that you deem the best.

1.1 How many persons own this AIS?	1.2 What is your AGE	1.3 IS THE RESPONDENT MALE OR FEMALE?	1.4 How many **YEARS** of education have you completed?
1.5 If 1.4 is above **14 and indicates** the field of study?	1.6 Which is your MAIN OCCUPATION?	1.7 Do you have another form of occupation? **Code A, if yes, go to 1.8**	1.8 What is your secondary occupation?
1.9 What is the name of your AIS (agrovet)?	2.0 Which social network is your AIS currently using to interact with your customers?	2.1 How old is your AIS?	2.2 Since you established the **AIS,** have you ever closed its operation for more than six consecutive months? **Code A,** if **Yes proceed to `2.3**

2.3 For how many months?	2.4 What was the main reason for the closure?	2.5 Is the building the AIS operating in, owned leased, or rented?	2.6 Do you have branches of the AIS in other locations? **Code A, if Yes go to 2.7**
2.7 How many branches of AIS do you have in other locations?	2.8 Which categories of products or services does your AIS offer?	2.9 Do you operate other businesses rather than AIS operations under the same roof? **Code A, if Yes, go to 3.0**	3.0 Please give the name of that other business operations.
3.1 What is your AIS mode of products sale? **Code B**	3.1 Is your AIS a member of any ASSOCIATION that ensures ethics and standards in the field are observed? **if Yes, 3.2**	3.2 Give the name of the association	3.3 Which government approval is/are required to operate an AIS in Nakuru county? Code **D**
3.4 Does your AIS has an extension section that educates customers on products and services offered? **Code A Yes, 3.5**	3.5 Give the name of the educators	3.6 IS THE educator MALE OR FEMALE?	3.7 What is the educator's years of schooling completed? **If 14 and above, 3.8**
3.8 What is the educator's field of study?	3.9 Is your AIS experiencing difficulty in getting any kind of skilled labor?	4.0 Which is your MAIN source that you usually get information concerning new products or services?	4.1 Give the MAIN reason for your choice of destination of sourcing information
4.2 Which are the main marketing channels that you usually use to reach, interact with new or potential customers?	4.3 Do you have a corporate social responsibility program or policy in place? **Code A**	4.4 How many training related to entrepreneurship or business management aspects have you attended in the last two years – 2017 and 2018?	4.5 Of the training you attended, how many were offered by government agencies?
4.6 Of the pieces of training you attended, how many were provided by non-government agencies?	4.7 Do you have any written or unwritten contractual agreement to supply products or services to a customer? **Code A**	4.8 How many contracts are you currently operating?	4.9 Are you in any collaboration or network, whether formal or informal, with any business partner(s)?

5.0 What is the nature of the collaboration/network? **Code C**	5.1 How many collaboration or networks are you currently engaged in?	5.2 Do you carry out regular analysis and interpretation of the financial statements for your AIS self-evaluation? **Code A**	5.3 Do you have a succession plan for your AIS? **Code A**
5.4 Do you have a business plan for this AIS?			

5.5 Agripreneurial Orientation

We will ask you for your opinion on some statements. There is no right or wrong answer. Feel free to indicate the extent of agreement or disagreement regarding your agribusiness operations perception. In your opinion, how do you perceive the following statements regarding your AIS's Entrepreneurial Orientation dimensions? (Code E).

Label	Statement	Perception
ao1	Have introduced several new or significantly improved agricultural products or offering services in the past 2 years in my AIS agribusiness	**Code E**
ao2	During the last 2 years, have introduced new or significantly improved distribution methods for inputs, products, or services in my AIS	**Code E**
ao3	Have you introduced new or significantly improved marketing channels and strategies during the last 2 years in my AIS's marketing operations?	**Code E**
ao4	During the last 2 years, I have established new or significantly improved supporting activities for the business operation	**Code E**

	and processes, such as maintenance and operations systems for purchasing, accounting, or digitalization.	
Label	**Statements**	**Perception**
ao5	I have been trying new ways of doing things and solving problems solutions in my business management practices.	**Code E**
ao6	I have a corporate culture in my business that allows adaptation to innovative ideas, technologies, methods, and goals.	**Code E**
ao7	In dealing with competitors, I typically initiate actions that competitors then respond to in my business operations.	**Code E**
ao8	Regularly, being the first to introduce new products, services, techniques, and technology in our industry or market?	**Code E**
ao9	When dealing with competitors, I always establish a competitive position and vigorously exploit the opportunity to achieve higher performance.	**Code E**
ao10	I continuously try to anticipate future needs and wants of my customers and strategises to meet them.	**Code E**
ao11	I have a strong preference for high-risk initiatives with chances of very high returns.	**Code E**
ao12	Under uncertainty situation, I always adopt an aggressive posture that maximises the probability of exploiting potential opportunities.	**Code E**
ao13	I have in place a risk management process or process	**Code E**
ao14	I'm not afraid to invest money in risky projects.	**Code E**

5.6 This section contains some business environmental aspect that might shape the trend of your agripreneurial orientation in your business operation kindly feel free to respond in your best way possible.

1 (a). Do you get adequate support from either NGOs or government agencies for technological up-gradation?	**Code A**
(b). **If 'yes'** State the kind of support	
(c). **If 'yes' in (a),** kindly specify the organization offering the support	
2 (a). Is there any capacity-building intervention and training undertaken by NGO or government agencies based on training gap analysis?	**Code A**
(b). State the organization that offered the capacity building intervention or training	
3 (a). Would you like to relocate your AIS to other places?	
(b). **If 'yes' in (a),** State the relocation place/region/county	
(c). **If 'yes' in (a),** which is the MAIN reason for relocation from your current location to a new place?	
(d). **If 'yes' in (a),** which is the MAIN reason that would stop you from relocating to the new place	
1. What is the most essential factor hindering your business COMPETITIVENESS in your industry?	

5.7 **How would you rate the following government agency services that enhance your business competitiveness in the industry?**

	Statements	**Perception**
1.	Corruption in government systems	**Code F**
2.	Easy of getting permit and approval	**Code F**
3.	Availability of training facilities and centres	**Code F**

4.	Security	**Code F**
5.	Power availability	**Code F**

5.8 Kindly rate the costs of acquiring the following items

		Perception
1.	Locally manufactured products	**Code H**
2.	Imported Products	**Code H**
3.	Technology	**Code H**
4.	Skilled labor	**Code H**
5.	Electricity	**Code H**
6.	Renting business premises	**Code H**

5.9 Agri-enterprise performance indicators

This section entails statements regarding business performance. Please provide accurate information as inferred in your past two financial year statements (2017 and 2018).

1.	**Statements**	**Value**
2.	How many off-pick months did you experience for the year 2017?	
3.	How many on-pick months did you experience for the year 2017?	
4.	How many off-pick months did you experience for the year 2018?	
5.	How many on-pick months did you experience for the year 2018?	
6.	During the 2017 off-peak season, how many employees did you operate within your AIS business operations	
7.	During 2017 on peak season, how many employees did you operate within your AIS business operations	
8.	During the 2018 off-peak season, how many employees did you operate within your AIS business operations	
9.	During 2018 on peak season, how many employees did you operate within your AIS business operations	
10.	During the 2017 off-pick season, on average, how many customers did you serve per day?	
11.	During the 2017 off-pick season, on average, how many new customers did you serve per day?	
12.	During the 2017 on-pick season, on average, how many customers did you serve per day?	
13.	During the 2017 on-pick season, on average, how many new customers did you serve per day?	

14.	During the 2018 off-pick season, on average, how many customers did you serve per day?	
15.	During the 2018 off-pick season, on average, how many new customers did you serve per day?	
16.	During the 2018 on-pick season, on average, how many customers did you serve per day?	
17.	During the 2018 on-pick season, on average, how many new customers did you serve per day?	
18.	During the 2017 off-peak season, on average, how much was your total sale in a month?	
19.	During 2017 on peak season, on average, how much was your total sale in a month?	
20.	During the 2018 off-peak season, on average, how much was your total sale in a month?	
21.	During 2018 on peak season, on average, how much was your total sale in a month?	6.
22.	How many off-pick months did you experience for the year 2017?	7.
23.	How many on-pick months did you experience for the year 2017?	8.
24.	How many off-pick months did you experience for the year 2018?	9.
25.	10. How many on-pick months did you experience for the year 2018?	11.

Thank you very much for your valuable time in participating in this survey.

Appendix B. Research permit

THIS IS TO CERTIFY THAT:
MR. DANIEL MUNYOKI MUSYOKA
of EGERTON UNIVERSITY, 536-20115
EGERTON,has been permitted to
conduct research in *Nakuru County*

on the topic: *EFFECTS OF AGRIPRENEURIAL ORIENTATION ON AGRI-ENTERPRISE PERFORMANCE AMONG AGRICULTURAL INPUT SUPPLIERS IN NAKURU COUNTY, KENYA*

for the period ending:
24th June,2020

Permit No : NACOSTI/P/19/21468/30776
Date Of Issue : 27th June,2019
Fee Recieved :Ksh 1000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

Appendix C. Paper abstract

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FACTORS INFLUENCING ENTREPRENEURIAL ORIENTATION LEVELS AMONG AGRI-INPUT SUPPLIERS IN NAKURU COUNTY, KENYA

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ABSTRACT

Start-ups and small-scale agri-input suppliers (AIS) play critical roles in Kenya's agricultural development sector. Nakuru county is the leading producer of flowers, potatoes, milk and vegetables in Kenya; creating an enabling environment for AIS start-upsto thrive. However, competition from established, medium and large-scale agri-enterprises put them at risk of closure or inhibition of their potential to survive the environmental turbulence and grow into medium or large-scale enterprises.Entrepreneurial orientation (EO) manifestations, in the form of proactiveness, innovation, and risk-taking, among other internal aspects, are considered necessary for any agri-enterprises' start-up success, as they positively influence their growth and performance. The objective of this study was to understand factors influencing EO levels among agri-input suppliers in Nakuru County, Kenya.A study involving a sample of 137 agri-input suppliers operating in Nakuru County was carried out using face-to-face semi-structured questionnaire. Data collected were analysed using Principal Component Analysis, Quartile technique, and the Generalised Ordered Logit (GOL) model. Overall, the variety of traded agri-input products showed the most significant positive influence on EO levels, followed by possession of business plan, partnership, customers' contracts and gender factors, in that order of magnitude. On the other hand, years ofagri-enterprise operation and the number of agri-input business owners showed negative influence on EO levels. The list of prioritised significant factors is important in informing agripreneurs, policy makers and socio-economic development agencies when designing development programmes and strategies aimed at promoting agripreneurship in Kenya.

Key Words: Agripreneur, entrepreneurial orientation, proactiveness, start-ups

Appendix D. Principal component analysis

```
. pca ao1 ao2 ao3 ao4 ao5 ao6 ao5 ao6 ao7 ao8 ao9 ao10 ao11 ao12 ao13 ao14, mineigen(1) means

Principal components/correlation                Number of obs    =        137
                                                Number of comp.  =          5
                                                Trace            =         16
    Rotation: (unrotated = principal)           Rho              =     0.6773
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5.21603	3.3909	0.3260	0.3260
Comp2	1.82512	.317438	0.1141	0.4401
Comp3	1.50768	.225727	0.0942	0.5343
Comp4	1.28196	.275346	0.0801	0.6144
Comp5	1.00661	.109436	0.0629	0.6773
Comp6	.897175	.0777573	0.0561	0.7334
Comp7	.819417	.100319	0.0512	0.7846
Comp8	.719098	.0774452	0.0449	0.8296
Comp9	.641653	.136195	0.0401	0.8697
Comp10	.505458	.0232704	0.0316	0.9013
Comp11	.482188	.084954	0.0301	0.9314
Comp12	.397233	.0131556	0.0248	0.9562
Comp13	.384078	.0677753	0.0240	0.9802
Comp14	.316303	.316303	0.0198	1.0000
Comp15	0	0	0.0000	1.0000
Comp16	0	.	0.0000	1.0000

Appendix E. Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
ao1	0.2027	0.0700	0.2878	-0.1412	-0.3537	0.5003
ao2	0.2037	0.2062	0.3644	-0.0860	-0.2756	0.4198
ao3	0.2884	0.0040	0.1170	-0.2303	-0.1089	0.4656
ao4	0.2466	0.2330	0.1626	0.2777	-0.3086	0.3492
ao5	0.2842	-0.4049	-0.2154	0.3045	-0.0305	0.8974
ao6	0.3024	-0.3609	0.1638	-0.2991	0.0203	0.1298
ao7	0.2239	0.1388	0.2654	0.2353	0.5463	0.2258
ao8	0.2292	0.0862	0.2088	0.4229	0.0690	0.4126
ao9	0.2789	0.1368	0.0072	-0.0119	-0.2621	0.4906
ao10	0.1762	0.1978	0.0432	-0.2598	0.5316	0.3928
ao11	0.2509	0.3071	-0.3350	-0.2326	-0.1136	0.2480
ao12	0.2026	0.0996	-0.4452	-0.0740	0.0473	00.4597
ao13	0.2149	0.2885	-0.0997	0.3039	-0.1137	0.4609
ao14	0.2595	0.1947	-0.4018	-0.1565	-0.0816	0.2980

Appendix F. Orthogonal varimax rotation estimation

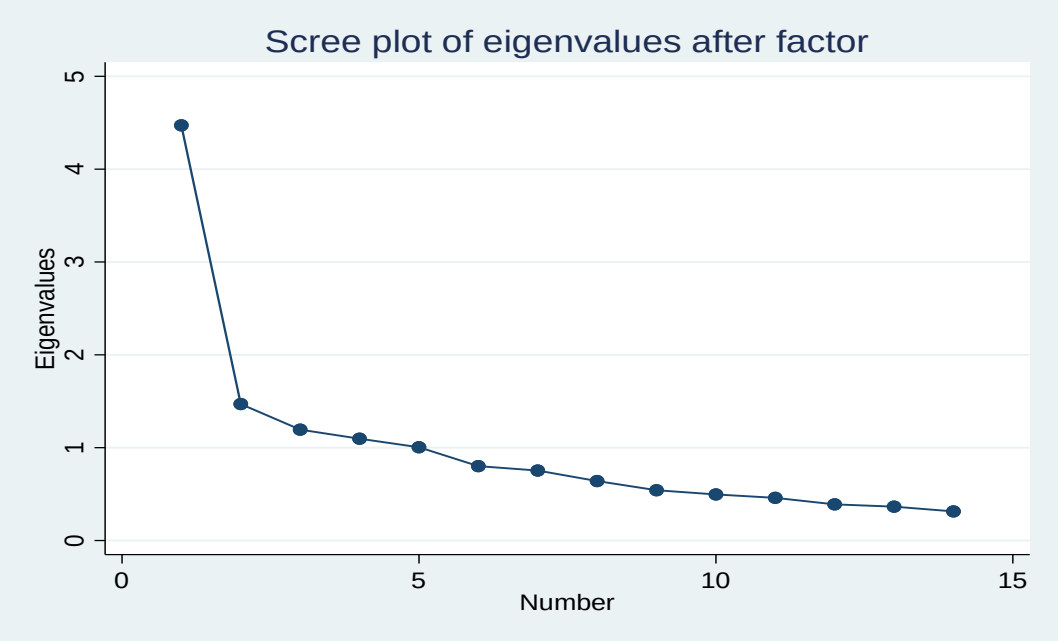
```
. rotate, kaiser

Principal components/correlation                  Number of obs    =        137
                                                  Number of comp.  =          5
                                                  Trace            =         16
    Rotation: orthogonal varimax (Kaiser on)      Rho              =     0.6773
```

Component	Variance	Difference	Proportion	Cumulative
Comp1	2.40459	.219945	0.1503	0.1503
Comp2	2.18465	.0102494	0.1365	0.2868
Comp3	2.1744	.0184151	0.1359	0.4227
Comp4	2.15598	.238195	0.1347	0.5575
Comp5	1.91779	.	0.1199	0.6773

Rotated components

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
ao1	0.2814	-0.0131	0.3966	-0.1345	-0.1381	.5003
ao2	0.2004	-0.0446	0.4619	-0.2111	-0.0121	.4198
ao3	0.3369	0.1232	0.1685	-0.0597	0.0333	.4656
ao4	-0.0877	0.0218	0.5478	0.0749	-0.0060	.3492
ao5	0.0706	0.0305	-0.0110	0.6151	-0.0194	.08974
ao6	0.5661	-0.0403	-0.0539	0.1082	0.0412	.1298
ao5	0.0706	0.0305	-0.0110	0.6151	-0.0194	.08974
ao6	0.5661	-0.0403	-0.0539	0.1082	0.0412	.1298
ao7	-0.0637	-0.1923	0.0486	0.0474	0.6693	.2258
ao8	-0.1358	-0.1696	0.3352	0.2208	0.2807	.4126
ao9	0.0626	0.1367	0.0388	0.0160	0.3755	.4906
ao10	0.1313	0.1363	-0.2022	-0.2272	0.5421	.3928
ao11	0.0286	0.5625	0.0873	-0.1078	0.0059	.248
ao12	-0.0479	0.4736	-0.1060	0.1269	0.0547	.4597
ao13	-0.2483	0.1929	0.3440	0.1287	0.1040	.4609
ao14	0.0130	0.5443	0.0232	0.0310	-0.0000	.298

Appendix G. Scree plot



Appendix H. Factor score prediction

```
. predict factor1 factor2 factor3 factor4 factor5, score

Scoring coefficients for orthogonal varimax rotation
    sum of squares(column-loading) = 1
```

Variable	Comp1	Comp2	Comp3	Comp4	Comp5
ao1	0.2814	-0.0131	0.3966	-0.1345	-0.1381
ao2	0.2004	-0.0446	0.4619	-0.2111	-0.0121
ao3	0.3369	0.1232	0.1685	-0.0597	0.0333
ao4	-0.0877	0.0218	0.5478	0.0749	-0.0060
ao5	0.0706	0.0305	-0.0110	0.6151	-0.0194
ao6	0.5661	-0.0403	-0.0539	0.1082	0.0412
ao5	0.0706	0.0305	-0.0110	0.6151	-0.0194
ao6	0.5661	-0.0403	-0.0539	0.1082	0.0412
ao7	-0.0637	-0.1923	0.0486	0.0474	0.6693
ao8	-0.1358	-0.1696	0.3352	0.2208	0.2807
ao9	0.0626	0.1367	0.0388	0.0160	0.3755
ao10	0.1313	0.1363	-0.2022	-0.2272	0.5421
ao11	0.0286	0.5625	0.0873	-0.1078	0.0059
ao12	-0.0479	0.4736	-0.1060	0.1269	0.0547
ao13	-0.2483	0.1929	0.3440	0.1287	0.1040
ao14	0.0130	0.5443	0.0232	0.0310	-0.0000

Appendix I. Parallel-line assumption test

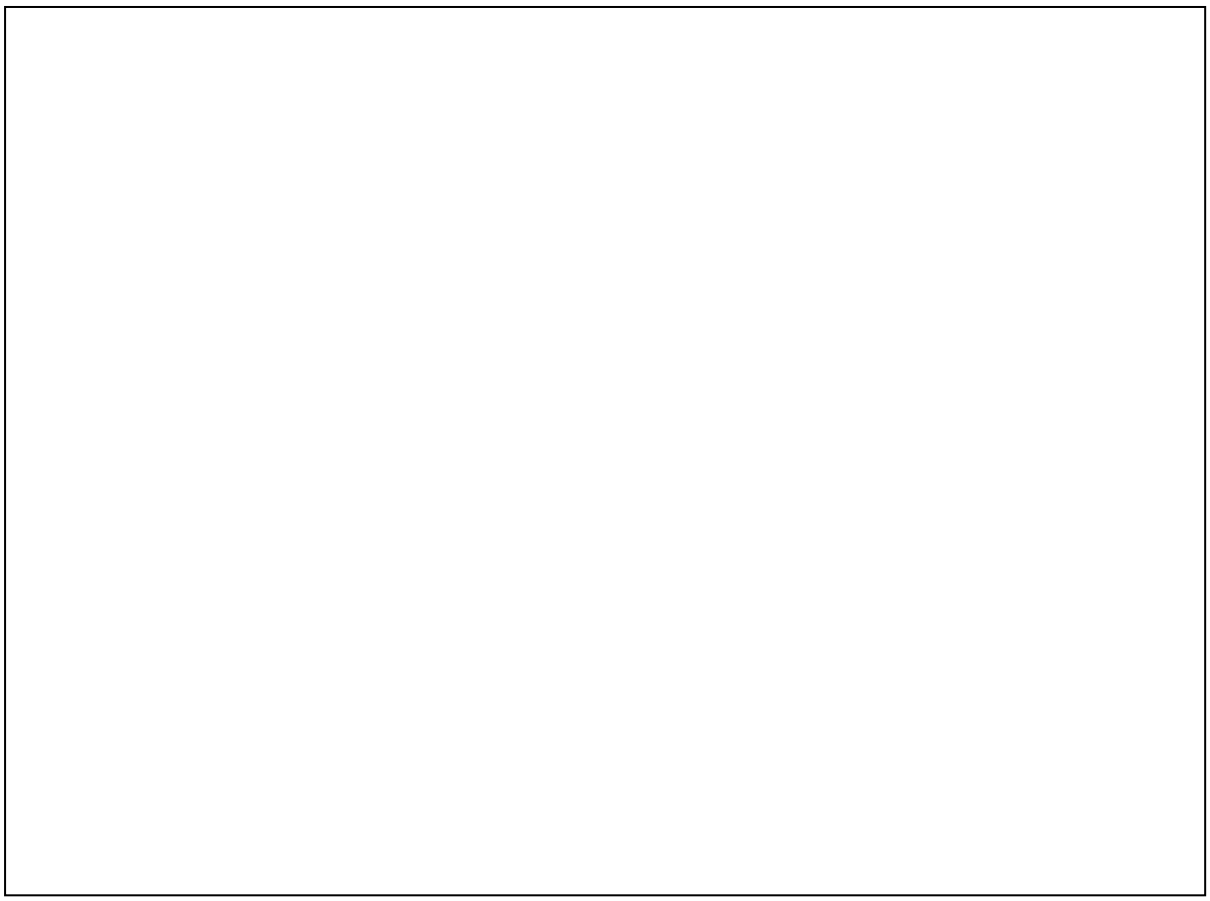
```
.  gologit2 levels occupation products1 Business_plan Partnership Contracts_No Trainings Diversification Br
> anches Business_Age Age Education i.Gender Ownership_Enterprise Selling_nature, autofit

------------------------------------------------------------------------------
Testing parallel lines assumption using the .05 level of significance...

Step  1:  Constraints for parallel lines imposed for Selling_nature (P Value = 0.9437)
Step  2:  Constraints for parallel lines imposed for Business_plan (P Value = 0.8807)
Step  3:  Constraints for parallel lines imposed for Trainings (P Value = 0.8387)
Step  4:  Constraints for parallel lines imposed for products1 (P Value = 0.7703)
Step  5:  Constraints for parallel lines imposed for Age (P Value = 0.7704)
Step  6:  Constraints for parallel lines imposed for Diversification (P Value = 0.7918)
Step  7:  Constraints for parallel lines imposed for Partnership (P Value = 0.7290)
Step  8:  Constraints for parallel lines imposed for Branches (P Value = 0.6973)
Step  9:  Constraints for parallel lines imposed for Contracts_No (P Value = 0.6733)
Step  10: Constraints for parallel lines imposed for Ownership_Enterprise (P Value = 0.4922)
Step  11: Constraints for parallel lines imposed for Education (P Value = 0.3419)
Step  12: Constraints for parallel lines imposed for Business_Age (P Value = 0.2766)
Step  13: Constraints for parallel lines imposed for 1.Gender (P Value = 0.1500)
Step  14: Constraints for parallel lines are not imposed for
          occupation (P Value = 0.02660)

Wald test of parallel lines assumption for the final model:

 ( 1)  [1]Selling_nature - [2]Selling_nature = 0
 ( 2)  [1]1.Gender - [2]1.Gender = 0
 ( 3)  [1]Business_plan - [2]Business_plan = 0
 ( 4)  [1]Trainings - [2]Trainings = 0
 ( 5)  [1]products1 - [2]products1 = 0
 ( 6)  [1]Age - [2]Age = 0
 ( 7)  [1]Diversification - [2]Diversification = 0
 ( 8)  [1]Partnership - [2]Partnership = 0
 ( 9)  [1]Branches - [2]Branches = 0
 (10)  [1]Contracts_No - [2]Contracts_No = 0
 (11)  [1]Ownership_Enterprise - [2]Ownership_Enterprise = 0
 (12)  [1]Education - [2]Education = 0
 (13)  [1]Business_Age - [2]Business_Age = 0

           chi2( 13) =    5.55
         Prob > chi2 =    0.9609

An insignificant test statistic indicates that the final model
does not violate the proportional odds/ parallel lines assumption

If you re-estimate this exact same model with gologit2, instead
of autofit you can save time by using the parameter
```

Generalized Ordered Logit Estimates — Number of obs = 137
LR chi2(28) = 85.93
Prob > chi2 = 0.0000
Log likelihood = -107.53768 — Pseudo R2 = 0.2855

levels	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1						
Age	.0095245	.0241144	0.39	0.693	-.0377389	.0567878
Gender						
male	.0759539	.5114039	0.15	0.882	-.9263794	1.078287
Education	-.0147883	.1370314	-0.11	0.914	-.2833649	.2537883
occupation	.6161169	.7290868	0.85	0.398	-.8128669	2.045101
Diversification	.3428164	.5521629	0.62	0.535	-.739403	1.425036
Business_plan	1.081679	.5484983	1.97	0.049	.0066416	2.156715
Business_Age	-.0968732	.0517908	-1.87	0.061	-.1983813	.0046348
Branches	.4157542	.5405038	0.77	0.442	-.6436138	1.475122
Ownership_Enterprise	-.6914739	.3031607	-2.28	0.023	-1.285658	-.0972899
Selling_nature	.3728279	.5871537	0.63	0.525	-.7779722	1.523628
products1	1.235528	.4225468	2.92	0.003	.4073512	2.063704
Trainings	.0750886	.0969618	0.77	0.439	-.1149531	.2651303
Contracts_No	.1733635	.060924	2.85	0.004	.0539548	.2927723
Partnership	1.27564	.6598892	1.93	0.053	-.017719	2.568999
_cons	-2.935409	2.424907	-1.21	0.226	-7.68814	1.817321
2						
Age	-.0009845	.0271212	-0.04	0.971	-.0541412	.0521721
Gender						
male	1.296345	.5562094	2.33	0.020	.2061942	2.386495
Education	.1569859	.1642713	0.96	0.339	-.1649799	.4789518
occupation	-.3171215	.7823561	-0.41	0.685	-1.850511	1.216268
Diversification	.5844689	.5968143	0.98	0.327	-.5852656	1.754203
Business_plan	1.20375	.6671918	1.80	0.071	-.1039215	2.511422
Business_Age	-.1494453	.0518198	-2.88	0.004	-.2510102	-.0478804
Branches	.2032239	.5395293	0.38	0.706	-.8542341	1.260682
Ownership_Enterprise	-.4136112	.3844944	-1.08	0.282	-1.167206	.3399839
Selling_nature	.3217053	.6084247	0.53	0.597	-.8707852	1.514196
products1	1.123021	.4500627	2.50	0.013	.2409141	2.005127
Trainings	.0472028	.0848389	0.56	0.578	-.1190784	.2134841
Contracts_No	.1500406	.0508841	2.95	0.003	.0503096	.2497716
Partnership	1.040319	.5762309	1.81	0.071	-.0890724	2.169711
_cons	-6.573143	3.016405	-2.18	0.029	-12.48519	-.6610983

Appendix J. Generalised ordered logit estimates

Appendix K. Entrepreneurial orientation components path coefficient



Appendix L. Entrepreneurial orientation levels path coefficient