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Entrepreneurial Orientation Profiles and Business Adaptation Among Youth Agripreneurs in a Fragile Economy

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Abstract

Youth unemployment constitutes a critical development issue in fragile economies, where agribusiness offering opportunities for enterprise creation, livelihoods, and rural transformation. However, the influence of entrepreneurial orientation (EO) on youth-led agribusinesses is understudied in the context of their strategic response to resource and institutional constraints. This study identifies distinct EO profiles among youth agripreneurs in South Kivu, Democratic Republic of Congo, and examines their determinants, business constraints, and adaptation strategies. Survey data from 340 youth-led agribusinesses were analyzed using descriptive statistics, exploratory factor analysis, partial least squares structural equation modeling, cluster analysis, and multiple regression. Risk-taking, innovation, and proactivity emerged as the three dimensions of EO, accounting 71.5% of total variance. Three entrepreneurial profiles were identified: low risk-taking with moderate innovation, high risk-taking with limited innovation, and consistently high innovation, proactivity, and risk-taking. Gender, income, marital status, education, and social networks significantly influenced EO across the identified profiles. Limited technical support, weak networks, restricted land access, and inadequate mentoring constrained enterprise development, while opportunity recognition, calculated risk-taking, and product innovation emerged as key adaptation strategies. The findings demonstrate that youth-led agribusinesses are strategically heterogeneous and need profile-specific business development interventions. Strengthening entrepreneurial capabilities, networks, mentoring, and accessing productive resources can enhance enterprise resilience while advancing youth employment and inclusive rural development in fragile economies. Furthermore, entrepreneurial capabilities and adaptive strategies have the potential to promote youth employment and strengthen rural livelihoods, thus contributing to the attainment of Sustainable Development Goal (SDG) 8 and impacting positively on SDG 1 and 2. The paper provides insights for consideration for promoting youth livelihoods through profiling the constraints and adaptation strategies of young agripreneurs. In this way, the paper contributes to knowledge on enterprises and entrepreneurship for sustainable rural livelihoods.

Key words: Entrepreneurial orientation; Business adaptation; Youth agripreneurship; Enterprise resilience; Inclusive rural development; Fragile economies.

1. Introduction

A country's demographic composition plays a significant role in determining its development [1]. As the region with the youngest population structure, sub-Saharan Africa (SSA) must create new employment opportunities for its youth, as they see potential for fighting poverty through employment [2]. The focus on youth entrepreneurial orientation (EO) in agriculture seems to be critical in terms of addressing the high unemployment rates and transforming rural areas [3]. Agribusinesses SMEs¹ are central to the livelihood of many people, which is particularly relevant in Africa, where a significant part of the population is under 35 years old [5]. Being innovative, proactive, and willing to take risks, entrepreneurial people may play a critical role in youth employment and improving livelihoods [6]. At the individual level, EO may be regarded as a set of behavioral patterns and decision-making mechanisms that lead to taking advantage of emerging opportunities despite various socio-economic and institutional challenges [7]. From a firm-level perspective, strategic response to the uncertainty and limited resources is critical to transforming entrepreneurial intentions into actual performance. The array of factors affecting youths' entrepreneurial response in agribusiness appears to be diverse and interconnected [8,9].

Some studies suggest that negative social judgment, a lack of skills and training, professional experience, funding, networks, and market opportunities may hinder the ability of young people to cope with various entrepreneurial challenges [8,9]. In low-income countries, differences in terms of resources, social networks, institutional support, and market opportunities may lead to diverse entrepreneurial responses to emerging opportunities [11, 24]. Assuming that youths' entrepreneurial response to opportunities is not uniform, one may expect different business strategies regarding opportunity recognition, risk-taking, innovativeness, and adaptation to address similar sets of challenges. Understanding heterogeneity in strategic responses is critical to promoting enterprise development, employment, and business-led rural transformation in the region. In the last decade, there has been a growing body of research documenting and analyzing the role of entrepreneurial orientation (EO) in facilitating rural livelihoods [13,14]. Studies suggest that entrepreneurial individuals, compared to their non-entrepreneurial counterparts, are more likely to engage in a

¹ National Criteria for SMEs in the DRC Micro-enterprises (Very Small): Employs 1 to 5 workers, with an annual turnover equivalent to around \$10,000 USD (in Congolese Francs), maintaining basic compliant accounting. Small Enterprises: Employs 6 to 50 workers, with an annual turnover ranging between \$10,000 and \$60,000 USD. Medium Enterprises: Employs larger teams (up to 200–250 employees depending on specific sectoral texts) with higher capital and asset thresholds [4].

wider range of entrepreneurial activities, including those that are innovative and offer higher returns [10,11].

In addition, increased levels of EO may lead to improved performance, competitiveness, and sustainability of smallholder enterprises [15–17]. Being innovative, proactive, and risk-taking, agripreneurs are more likely to recognize and seize emerging opportunities and address various constraints [10,18]. The importance of promoting entrepreneurial activity is reflected by the fact that the poverty rate in the eastern part of the DRC is as high as 84.7% compared to 71.3% nationwide. This region is characterized by a high youth population but limited job opportunities. In addition, only a small proportion of university graduates are able to secure jobs [19]. To address the regional employment challenges, a number of programs have been initiated to train young people, promote their entrepreneurial activity, develop enterprises with due innovation, and facilitate access to finance in various agricultural value chains [20,21]. Despite the efforts of national and international stakeholders, youth involvement in agribusiness appears to be limited, which is a serious concern since the sector has the potential to create employment and promote economic growth [22]. The limited impact of programs aimed at promoting youth entrepreneurship may be explained by the fact that most youths' enterprises are informal and face numerous socio-economic constraints [9]. There is a need to facilitate youth-led formal businesses that are able to offer sustainable employment and contribute to the local economy.

Despite the growing body of research on youth entrepreneurship and agribusiness [8], three critical gaps persist. First, whereas existing studies have mostly focused on entrepreneurial intentions, participation, entrepreneurial potential, and gender-based differences [23], few studies actually focus on entrepreneurial behavior and strategic heterogeneity [24,25]. Such studies often characterize youth participation as either opportunity- or necessity-driven [9], providing limited insights into the diversity of entrepreneurial strategies among youth-led agribusinesses. Apart from promoting enterprise creation, youth agripreneurship contributes to sustainable development, particularly in vulnerable rural economies [26]. Sustainable development means providing inclusive and resilient economic opportunities while enhancing sustainable food and livelihood systems. In this regard, promoting youth-led agribusiness promotes SDG 8 by creating productive employment and entrepreneurial opportunities

for young people. At the same time, it promotes sustainable livelihoods by contributing to SDG 1, providing income and livelihood opportunities and enhancing resilient and sustainable agricultural production systems such as those promoted by SDG 2[27,28]. Therefore, there is a need to understand how entrepreneurial orientation influences entrepreneurial strategies that young agripreneurs use to overcome institutional and resource constraints to promote resilience and sustainable development in rural enterprises. Second, conventional variable-centered approaches offer limited understanding of the combinations of innovation, proactivity, and risk-taking that may result in distinct EO profiles. Consequently, little is known about the heterogeneity of EO among youth agripreneurs and the factors shaping their entrepreneurial trajectories in fragile rural economies. Third, limited empirical evidence explains how distinct EO profiles interact with socioeconomic characteristics, resource constraints, and adaptive business responses [8,12]. These gaps are pertinent in agribusiness, where entrepreneurs need to navigate market uncertainty, weak institutions, limited productive resources, and livelihood pressures [10,29]. This study fills gaps by identifying distinct EO profiles among youth agripreneurs in eastern DRC and examining their determinants, business constraints, and adaptation strategies. Specifically, it seeks to answer these questions: What distinct entrepreneurial orientation profiles characterize youth-led agribusinesses in a fragile economy, which socioeconomic and network factors differentiate entrepreneurial orientation across these profiles and what business constraints do youth agripreneurs face, and which adaptation strategies do they employ in response?

Following the studies of youth engagement, constraints, and performance in agribusiness [30–32], the study proposes the following hypotheses:

Hypothesis 1 (H1): *Innovation, sensitivity to business opportunities (proactivity), and composure in the face of hardships (risk-taking) are perceived as key adaptation strategies among youth in agribusiness.* Hypothesis 2 (H2): *Furthermore, education level, age, gender, income, marital status, agricultural experience, and social networks are the main determinants of EO profiles.*

Hypothesis 3 (H3): *Limited access to finance, technical support, mentoring and coaching, networking opportunities, and land are the primary obstacles faced by youth in agribusiness.*

Accordingly, the study pursues three objectives: (i) to identify the dimensions of entrepreneurial orientation among youth agripreneurs and (ii) classify them into distinct profiles, and (iii) to examine the determinants of EO while analyzing barriers and adaptation strategies in Eastern DRC. EO profiles in South Kivu were identified using typology, exploratory factor analysis (EFA), and partial least squares (PLS) models based on risk-taking, innovation, and proactivity. Determinants of EO across profiles were assessed using linear regression and descriptive analysis highlighted the major challenges and coping strategies of youth agribusiness enterprises.

Most entrepreneurship studies are based on the Theory of Planned Behavior (TPB), developed in social psychology to explain and predict behavior [33] , while others rely on EO–performance theory, complemented by insights from Resilience Theory and the Resource-Based View (RBV) [17] . Building on these perspectives, this study conceptualizes EO as a strategic orientation through which enterprises respond to opportunities and uncertainty by combining innovation, proactiveness, and risk-taking. Rather than assuming the three dimensions operate uniformly across firms, the study adopts a person-centered perspective to examine whether distinct configurations of EO characterize youth-led agribusinesses. This perspective is supplemented by the RBV and resilience literature, which suggest that firms' strategic responses depend on their access to resources, capabilities, networks, and ability to adapt under adversity [17]. To further explain how individual characteristics, intentions, attitudes, decisions, and behaviors shape entrepreneurial responses, the study draws on the theory of reasoned choice [40], developed from the work of Fishbein and Ajzen [33,34] and widely applied in agribusiness research [35–37] . This perspective complements previous African and global research on youth orientation toward agriculture [38,39] and studies conducted in the DRC and Eastern Congo [5,8,40,41]. In fragile economies, where institutional support and productive resources are constrained, differences in socioeconomic characteristics, resources, capabilities, and networks could generate heterogeneous entrepreneurial strategies [34]. Integrating EO with resource, resilience, and reasoned-choice perspectives therefore provides a framework for explaining both entrepreneurial heterogeneity and the adaptive responses of youth-led agribusiness under uncertainty.

Thus, since, young agripreneurs, through their diverse skills and adaptive strategies, are helping fragile rural economies thrive—creating jobs, reducing poverty, and building sustainable agribusiness systems [42]. This study contributes to entrepreneurship and agribusiness literature in three key ways. First, it develops and validates a multidimensional entrepreneurial orientation (EO) scale among youth agripreneurs in a conflict-affected African context. Second, it goes beyond conventional variable-centered approaches to identify distinct EO profiles through cluster analysis. Third, it integrates entrepreneurial determinants, perceived barriers, and adaptive responses into a unified analytical framework, providing new insights into how youth entrepreneurs navigate agribusiness opportunities under conditions of economic uncertainty and institutional fragility. Section 3 outlines the methodology, Section 4 presents and discusses the results, and Section 5 provides recommendations. The research ultimately aims to inform programs that enable youth to establish sustainable agribusinesses in South Kivu. This is the first comprehensive assessment of youth EO profiles in agribusiness in Eastern DRC.

2. Materials and Methods

2.1. Conceptual and theoretical framework of Entrepreneurial Orientation (EO)

a. Conceptual framework

Scholars define entrepreneurial orientation (EO) as the ability of a firm to innovate, take risks, and act proactively to meet customer needs by offering new goods or services, take advantage of available resources, and taking risks before competitors [43]. This definition comprises three main dimensions: innovation, risk-taking, and proactivity. Research further suggests that EO applies in companies of any age, size, or ownership structure [44]. In line with Fishbein and Ajzen's work [34], entrepreneurial actions are deliberately planned, evaluated, and assessed for potential risks. Essential entrepreneurial skills comprise communication, planning, networking, inventiveness, self-confidence, and the ability to identify opportunities within one's environment [8]. Agripreneurs, therefore, need to develop managerial competencies to effectively manage their enterprises. In this study, EO is understood as the most observable trait of entrepreneurship, exemplified in the abilities of potential entrepreneurs to demonstrate innovation, proactivity, and risk-taking throughout the business creation process.

b. Entrepreneurial landscape and Challenges to agricultural entrepreneurship depriving the South-Kivu of a solution to youth unemployment

The Democratic Republic of Congo's (DRC) economy relies mainly on mining exports [45]. The industrial sector is limited, and the formal private sector remains underdeveloped [61]. The potential for agricultural entrepreneurship to transform the economy and generate youth employment in South Kivu has long been recognized. With fertile soil and a favorable climate, the region offers significant opportunities for agribusiness development [8,46,47]. However, persistent social, political, and developmental challenges prevent South Kivu from fully leveraging agriculture to address youth unemployment [31]. The most critical issue comprises political instability: ongoing conflicts and insecurity disrupt rural livelihoods, deter investment, and create uncertainty [32]. Youth who might otherwise establish businesses are often displaced or denied access to land and resources, limiting their ability for risk-taking and innovation—key aspects of entrepreneurship [48]. In addition, inadequate infrastructure presents another significant barrier. Poor roads, the lack of storage facilities, and reliable electricity restrict the commercialization of agricultural products [49]. Youth agripreneurs cannot transport goods cost-effectively, diminishing profitability and discouraging sustained engagement. Insufficient infrastructure also constrains entrepreneurial orientation by limiting opportunities to scale agribusiness ventures [50].

In South Kivu and throughout the DRC, access to finance is a challenge for agricultural activities, which could limit credit availability for young entrepreneurs seeking to establish and scale agribusiness ventures [23,51]. Without tailored financial products, youth cannot invest in modern technologies, inputs, and value addition. As a result, many operate at small scales, remain exposed to shocks, and are trapped in cycles of poverty and unemployment [52]. Weak institutional and legal frameworks exacerbate the situation, as poorly designed agricultural policies and limited extension services offer few opportunities for skill development [53]. Without capacity-building measures, youth lack the knowledge and competencies needed to innovate in agribusiness [5,54]. Cultural and gender-related barriers also hinder participation. Many young people aspire to urban employment and perceive agriculture as unattractive, weakening the development of a dynamic entrepreneurial community [8,9,23].

To address these challenges, the International Institute of Tropical Agriculture (IITA) has implemented several youth-focused projects in South Kivu. The Start Them Early Program (STEP) fosters agricultural entrepreneurship by cultivating an entrepreneurial spirit from the age of 10 through school-based initiatives. Using participatory, interactive, and “learning by doing” methods, STEP combines knowledge transfer, skill development, and competency building [55]. In addition, governments and development partners have launched multiple initiatives targeting youth aged 18–35, including the IITA Youth in Agribusiness (IYA) program, the Agriculture and Agribusiness Youth Entrepreneurship Project (PEJAB) supported by the African Development Bank (AfDB), and the World Bank-funded Integrated Project on Agricultural Growth in the Great Lakes Region (PICAGL) [54,56]. Based on this evidence, the study hypothesizes that youth entrepreneurship positively influences employment creation, social inclusion, and economic development, especially in high-growth sectors [57]. As noted by prior research [7], self-employed youth often employ their peers, thereby stimulating job creation within their communities [58].

2.2. Theoretical framework

To examine entrepreneurial orientation (EO), prior empirical studies have drawn on several theoretical frameworks, among them Ajzen’s Theory of Planned Behavior (TPB) [5,34,59,60], which emerged in social psychology as a mechanism to predict predicting behavior. The theory assumes that decisions and behaviors result from intentions to act in a particular direction. However, it underestimates the role of opportunities in entrepreneurial activity. Thus, it was complemented by the Theory of Reasoned Choice, which emphasizes opportunities as key drivers of EO [34]. Based on both models, this study explains EO among youth agripreneurs in the study area. The Reasoned Action Model, widely validated in research on business creation [8,36,37], was used to guide item development. Developed by Fishbein and Ajzen [34], it defines the links between individuals’ socio-economic traits, attitudes, intentions, decisions, and behaviors. The model posits that socio-economic factors shape attitudes, which in turn influence the structure of beliefs. Studies [24,61] highlight that attitudes, combined with behavior and social norms, play a significant role in business creation. On the other hand, financial constraints, limited training, and perceptions of behavioral control exert weaker influence on EO. Accordingly, this study examines not only the determinants of EO among youth but also the challenges they face, and the adaptation strategies applied by youth-led SMEs in agribusiness. Previous research

has analyzed EO using organizational and socio-economic variables [29,62], noting that organizational level, age, education, income, marital status, and agribusiness experience are critical to understand the entrepreneurial process. Based on these observations and our hypotheses, we propose a theoretical model linking managers' socio-economic profiles to EO among SMEs in agribusiness (see Figure 1).

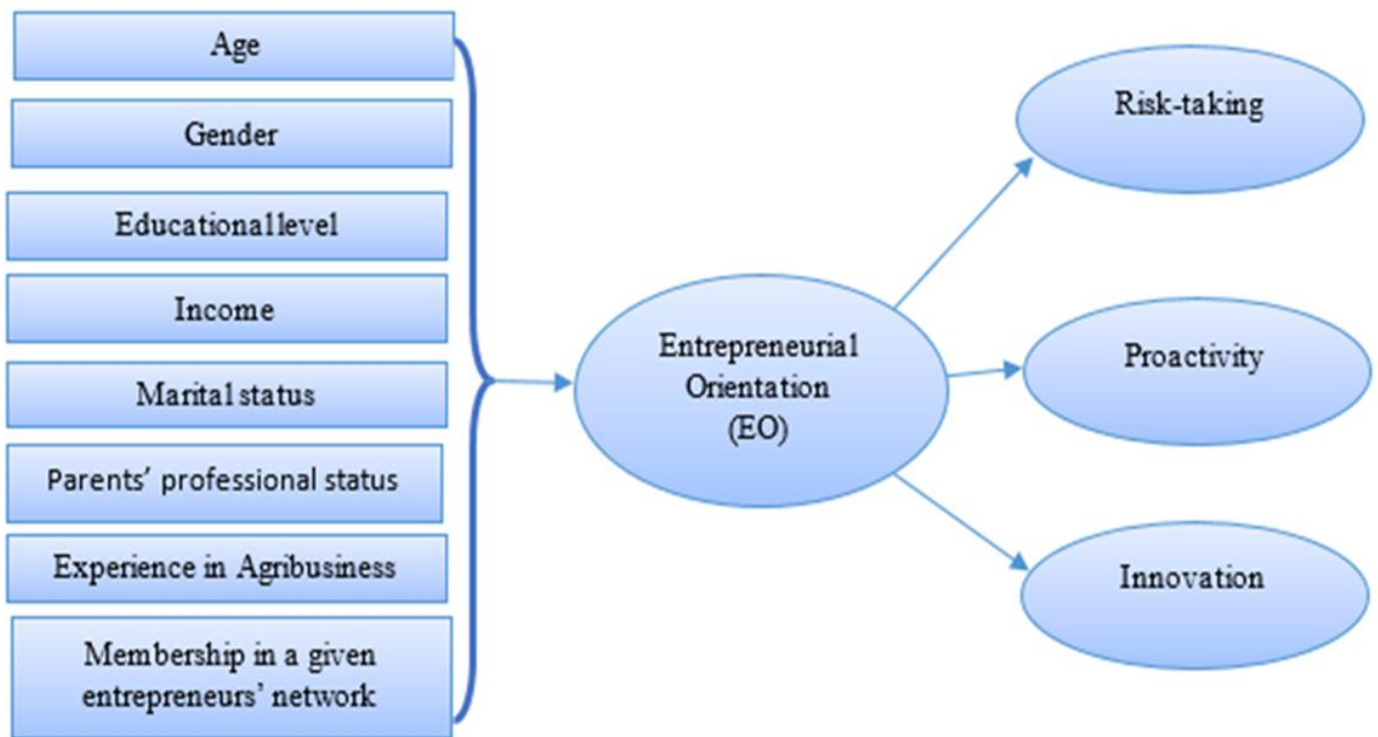


Figure 1: Theoretical research model inspired by [29,34] and [17] studies. Authors' conceptualization.

2.3. Data Collection Scheme

This study focuses on agro-enterprises established in South Kivu, from which a random sample of 340 youth-led agribusinesses was taken from four territories—Kalehe (Alt: 1,549 m.a.s.l., Long: E28.6655°, Lat: S2.0687°), Kabare (Alt: 1,473 m.a.s.l., Long: E28.67832°, Lat: S2.4824°), Uvira (Alt: 853 m.a.s.l., Long: E29.1765°, Lat: S3.2883°), and Fizi (Alt: 1,253 m.a.s.l., Long: E28.8441°, Lat: S4.3148°)—and Bukavu city (Alt: 1,659 m.a.s.l., Long: E28.8237°, Lat: S2.5144°) in Eastern DRC (Figure 2). Data collection involved questionnaires administered to the youth-led agribusiness, in addition to interviews conducted with the head of South Kivu's Division of Small and Medium Enterprise (SMEs). These interviews were useful in understanding policies promoting entrepreneurship and the challenges hindering

youth participation. Participants were selected using a snowball sampling method inspired by prior studies [63,64]. The survey itself was carried out over 24 days by a team of six trained enumerators, all of whom held at least undergraduate degrees. Using smartphones equipped with Open Data Kit (ODK) software, enumerators collected responses after receiving pre-survey training on how to manage and avoid errors. The design of the questionnaire was informed by literature conceptualizing EO as a tri-dimensional construct—risk-taking, proactivity, and innovation [62,65]. The questionnaire comprised three main sections. The first focused on socio-economic characteristics, including gender, marital status, age, education, parents' profession, network membership, activity field, and monthly income. The second addressed examined youth orientation in agribusiness, addressing the emergence of business ideas, motivations, influencing factors, and the dimensions of entrepreneurial orientation (EO). The third was inspired by prior studies [62,66] and explored business opportunities and challenges, including scales to measure entrepreneurial intent, barriers, and adaptation strategies adopted. A pre-test was carried out to ensure that all questions were relevant, understandable, and capable of producing consistent information. EO was measured using a six-point Likert scale, ranging from 1 = *Strongly disagree* to 6 = *Strongly agree*.

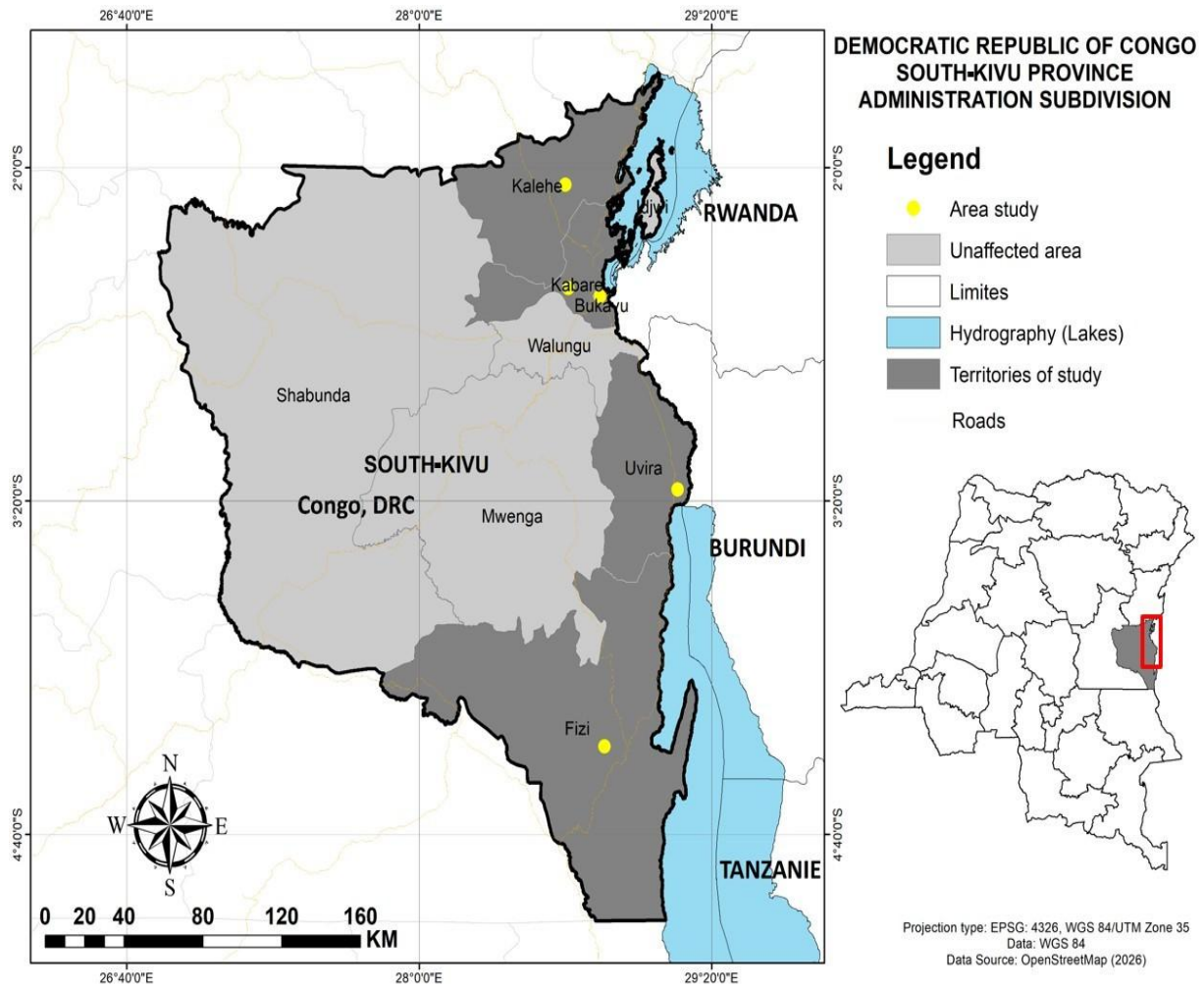


Figure 2: Location representing the study areas. Source: Study area (As conceptualized by the Author's).

2.4. Data analysis techniques, Reliability and Validity of the Measurement Scales

A mixed analytical framework was adopted to capture both the structure and heterogeneity of entrepreneurial orientation. Exploratory Factor Analysis (EFA) was first employed to detect the underlying dimensions of EO, followed by Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) to validate the measurement model and assess relationships among latent constructs. To uncover heterogeneity among respondents, K-means cluster analysis was applied to identify distinct entrepreneurial profiles. Finally, multiple regression models were estimated to determine the socio-economic factors influencing EO across different clusters. Data analysis combined EFA, Partial Least Squares (PLS) structural equation modelling, multiple linear regression, and descriptive analysis, as suggested by prior studies [67].

Factor analysis was used to refine measurement scales related to EO among youth agripreneurs, ensuring the robustness of its dimensions. Following recommendations [68,69], data suitability for factor analysis was first examined using the Kaiser-Meyer-Olkin (KMO) index ($KMO \geq 0.5$) and Bartlett's Test of Sphericity ($p \leq 0.05$). An iterative purification process was carried out, guided by representation quality, eigenvalues, explained variance, and structural coefficients. Items with low communalities (<0.5) or cross-loadings on multiple components were deleted, consistent with established approaches [70,71]. To maximize interpretability, an orthogonal varimax rotation was applied, ensuring each item was strongly correlated with only one component [72,73]. The purification process ended when the total explained variance reached 60%, in line with recommended thresholds [74,75]. Reliability of the scales was validated using Cronbach's alpha (α) coefficients, with $\alpha \geq 0.7$ considered acceptable. Using the purified EO scales from EFA, multiple linear regression models were then applied to analyze the effect of socio-economic determinants on EO profiles among youth agripreneurs in South Kivu. In these models, EO was the dependent variable, and explanatory variables encompassed respondents' socio-demographic and socio-economic characteristics. The model is specified as follows:

$$EO = \beta_0 + \beta_1 AGE + \beta_2 GENDER + \beta_3 EDUCATIONLEVEL + \beta_4 MARITALSTATUS + \beta_5 PARENTSPROFESSION + \beta_6 INCOME + \beta_7 SOCIALNETWORK + \varepsilon_i$$

In this model, EO stands for entrepreneurial orientation; AGE stands for respondents' age; GENDER is a binary variable equal to 1 for female and 0 for male; EDUCATIONLEVEL captures the highest level of education attained (included as a categorical variable using dummy indicators); MARITALSTATUS stands for the respondent's marital status; PARENTSPROFESSION reflects the professional background of the respondent's parents; INCOME refers to monthly income level; and SOCIALNETWORK indicates membership in an entrepreneurial or social network. Finally, ε_i is the stochastic error term.

3. Results

3.1. Socioeconomic Characteristics of Respondents

The results in Table 1 indicate that the surveyed youths are mainly male, accounting for 74.1% of respondents, while females comprise 25.9% of the study sample. Significant proportions of respondents are single (57.6%), and attendance records

from scheduled training sessions corroborate that single youths participated in greater numbers. In terms of education, most respondents hold a bachelor's degree (60.9%), followed by postgraduate diploma holders (26.5%), secondary school dropouts (11.5%), and master's degree holders (1.2%). Evidence from the study area confirms that education level critically influences youths' perceptions of agriculture and their participation in agribusiness. Scholars [8] attested that differences in educational attainment—whether bachelor's, postgraduate, or secondary—significantly affect the likelihood of starting an agribusiness and whether it is viewed as a desirable career. In addition, parental background plays a role: approximately 70.9% of respondents reported that their parents had independent professional status (trader or farmer). In terms of income, most surveyed youths (55.9%) reported average monthly earnings between \$101 and \$299, implying that, as SMEs, they are not yet generating substantial income.

3. **Table 1.** Summary of Socioeconomic characteristics of respondents

Variables	Terms & Conditions	Frequencies	Percentage
Gender	Male	252	74.1
	Female	88	25.9
	Total	340	100.0
Marital status	Single	196	57.6
	Married	144	42.4
	Total	340	100.0
Education level	Secondary	39	11.5
	Undergraduate	90	26.5
	Post-graduate	207	60.9
	Master's Degree	4	1.2
	Total	340	100.0
Parents' profession	Unemployed	17	5.0
	Executive (Public Servant)	31	9.1
	Employee (Private Sector)	20	5.9
	Independent (Trader, Farmer)	241	70.9
	Teacher	29	8.5
	Other	2	0.6
	Total	340	100.0

Activity field	Marketing	18	5.3
	Crop production	104	30.6
	Breeding	104	30.6
	Agro-Processing	64	18.8
	Fish farming	17	5.0
	Agro-Processing & Agro-Production	23	6.8
	Other	10	2.9
	Total	340	100.0
Monthly income	\$50 to \$99	54	15.9
	\$101 to \$299	190	55.9
	\$300 to \$499	61	17.9
	\$500 to \$1000	19	5.6
	\$1000 and over	16	4.7
	Total	340	100.0
Membership in some agri-entrepreneurs' network/association	Yes	101	29.7
	No	239	70.3
	Total	340	100.0

Source: authors' computation.

3.2. The Exploratory Factor Analysis (EFA) on the EO measurement scale

The results of Bartlett's test and the KMO index [$KMO = 0.769$; $\chi^2 = 1086.296$ (36); $p < 0.001$] in Table 2 confirm that the data on entrepreneurial orientation (EO) is suitable for factor analysis. This means that items from the EO measurement scale can be combined into a reduced number of factors or principal components. One item from the initial scale was deleted due to low representation quality (<0.5) and high cross-loadings (>0.4) across several factors. The final solution, after this adjustment, is given in Table 2. The factor analysis revealed that EO among youth in agribusiness is a multidimensional construct comprising three components: risk-taking, innovation, and proactivity. Together, these components account for 71.5% of the total variance. The first component, risk-taking comprises five items measuring youths' willingness to take risks in agribusiness. It explains 35.8% of the variance, with factor loadings varying

between 0.649 to 0.846—for instance, “I often like trying new and unusual activities that are not typical but not necessarily risky” and “I favor experimentation and original approaches to problem-solving rather than using methods generally applied by others”. The second component, proactivity, comprises two items assessing the extent to which youths adopt proactive strategies. It explains 17.9% of the variance, with loadings varying between 0.873 and 0.898. Finally, the third component, innovation, also comprises two items, accounting for 17.7% of the variance, with representation qualities ranging between 0.586 to 0.815. All retained items demonstrate acceptable reliability and strong representation quality.

4. Table 2. The dimensions of Entrepreneurial Orientation (EO)

Retained items	Risk-taking	Proactivity	Innovation	Com.
I am willing to invest a lot of time and/or money in something likely to yield a high return.	.846			.718
I tend to act "boldly" in situations where risk is involved.	.842			.727
I like taking bold steps by venturing into the unknown.	.839			.715
I often like trying new and unusual activities that are not typical but not necessarily risky.	.797			.653
I favor experimentation and original approaches to problem-solving situations rather than using methods that others typically use to solve their problems.	.649			.763
I prefer "stepping up" and getting things done on projects rather than sitting back and waiting for someone else to do it.		.898		.757
I tend to plan my projects in advance.		.873		.586
I usually prefer placing a strong emphasis on projects requesting unique approaches rather than revisiting tried and tested approaches used before.			.873	.799
I prefer trying my own way of learning new things rather than proceeding like everyone else.			.867	.815
Variances explained by factor (in percentage)	35.857	17.895	17.706	
Total variance explained = 71.458				

Note: Com: Communalities (correlation). *Source: authors' computation.*

3.3. Confirmatory factor analysis (CFA) on the EO measurement scale

Figure 3 presents the entrepreneurial orientation model and shows that all items have acceptable factor loadings. The results indicate a good model fit ($\chi^2 = 1572.98$, $df = 101$, $p < 0.001$). Thus, a tri-dimensional measurement model was retained to operationalize entrepreneurial orientation among youth in agribusiness. The model shows that EO data fit best with three dimensions: risk-taking, proactivity, and innovation. Figure 3 further shows that all three dimensions exhibit strong reliability, as assessed by Cronbach's alpha: 0.707 for innovation, 0.860 for risk-taking, and 0.751 for proactivity. The measurement model also aligns with thresholds recommended by Roussel et al. (2002), with GFI = 0.969, CFI = 0.979, NFI = 0.958, and SRMR = 0.040. All items are significantly related ($p < 0.001$) to their respective dimensions, with standardized factor loadings exceeding 0.60.

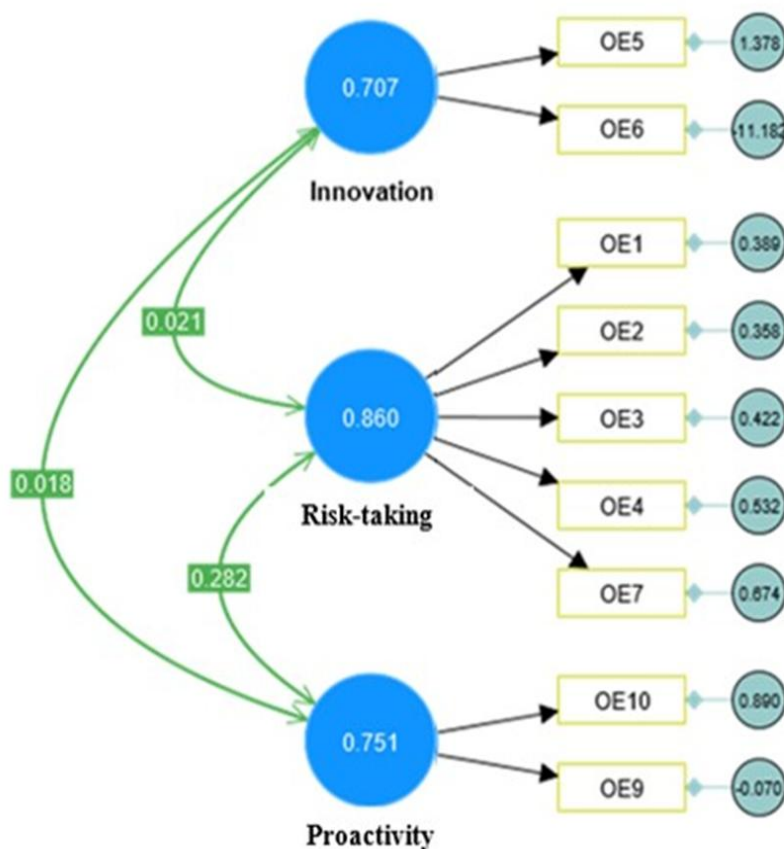


Figure 3. Confirmatory Factor Analysis (CFA) of EO measurement scale. Authors' conceptualization.

Table 3 reports the reliability and validity of the measurement model, demonstrating excellent internal consistency. Cronbach's alpha values confirm strong reliability for

the three dimensions of entrepreneurial orientation: risk-taking ($\alpha = 0.860$), innovation ($\alpha = 0.707$), and proactivity ($\alpha = 0.751$), in line with the standards proposed by Hair and Afthanorhan [76,77]. Figure 4 presents the structural equation model (SEM) examining the determinants of entrepreneurial orientation and its influence on innovation, risk-taking, and proactivity. Among the explanatory variables, gender has a positive and statistically significant effect on EO ($\beta = 0.270$; $p = 0.015$), meaning that entrepreneurial orientation varies across gender categories. Income also exerts a positive and significant influence ($\beta = 0.145$; $p = 0.030$), implying that individuals with higher income levels are more likely to demonstrate EO characteristics. The results further reveal that EO strongly and positively predict innovation ($\beta = 0.433$; $p < 0.001$), risk-taking ($\beta = 0.891$; $p < 0.001$), and proactivity ($\beta = 0.567$; $p < 0.001$). The strongest relationship is found between EO and risk-taking, highlighting that willingness to engage in uncertain business activities is main behavioral manifestation of EO among the studied population. Coefficients of determination show that EO explain 18.7% of the variance in innovation ($R^2 = 0.187$), 79.4% in risk-taking ($R^2 = 0.794$), and 32.1% in proactivity ($R^2 = 0.321$). Overall, the model shows that entrepreneurial orientation is a key mechanism driving entrepreneurial behavior, particularly through enhanced innovation capacity, proactive engagement, and risk-taking within agribusiness ecosystems.

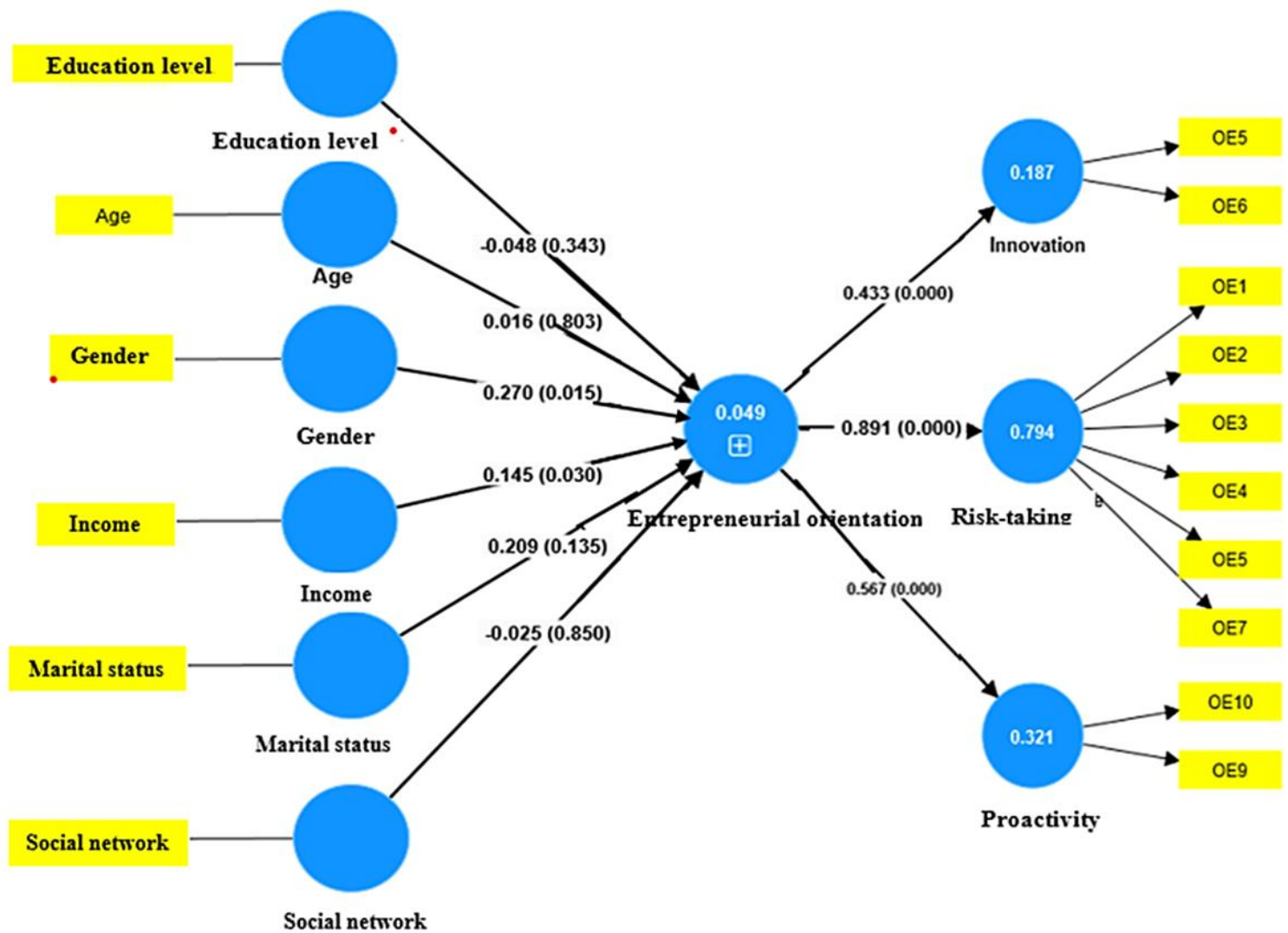


Figure 4. Highlighting the different determinants of EO in relation to the three dimensions. Authors' conceptualization.

3.4. Entrepreneurial Orientation Profiles of Young Agripreneurs in South-Kivu

Beyond variable-centered analyses such as regression, a person-centered segmentation was performed to identify entrepreneurial orientation (EO) profiles of the 340 agripreneurs. The agripreneurs' segmentation was based on the three EO dimensions, namely, innovation, risk-taking, and proactivity, using the K-means algorithm. The selection of a three-cluster solution ($K = 3$) was justified by the validity indexes, including the silhouette coefficient [78] and Alvarez [71], used to assess clustering solutions. This study identified three EO profiles that revealed the multidimensionality of EO [79] : (1) the low entrepreneurial orientation, (2) the high risk-taking but the low innovation, and (3) and the high entrepreneurial orientation [80] (see figure 5).

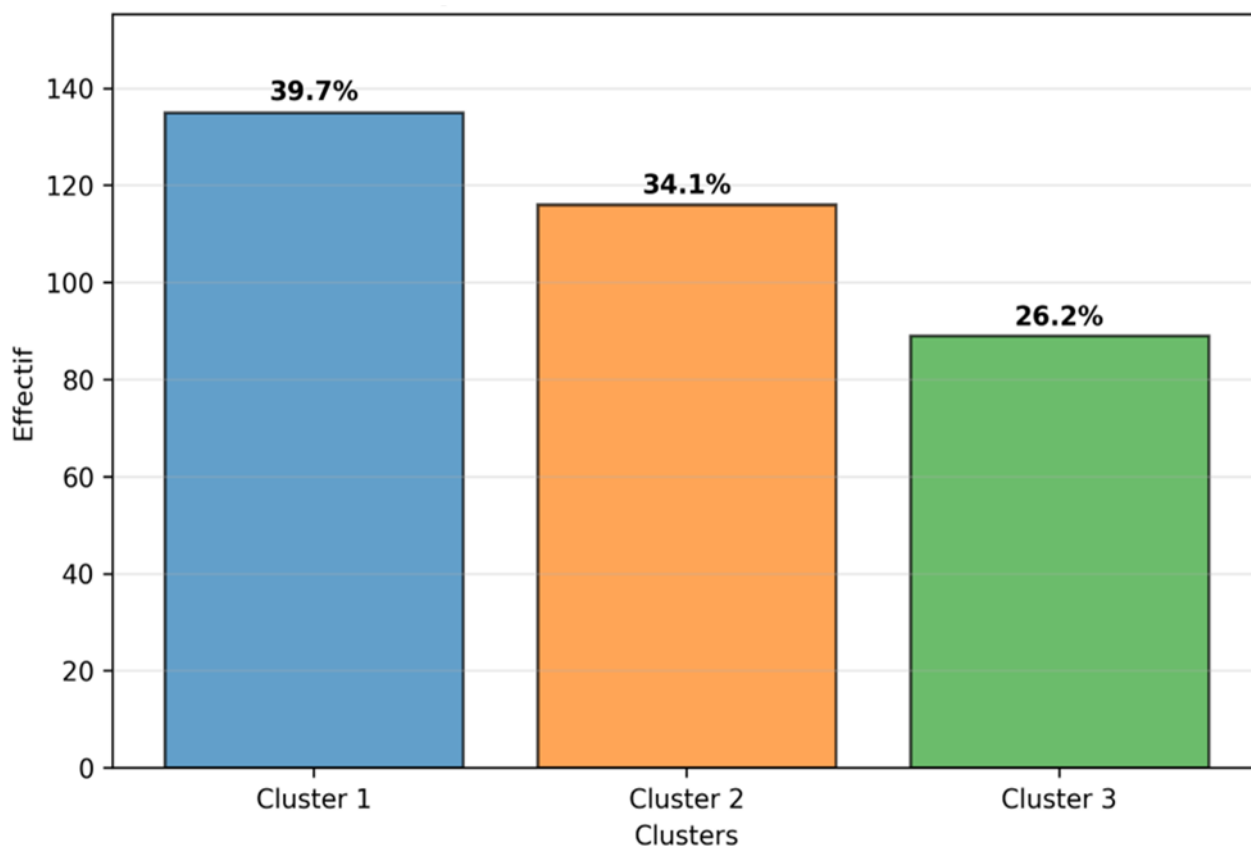


Figure 5. Sample size by cluster. Authors' conceptualization.

It is worth noting that, apart from the identified EO gradients, the study also revealed asymmetrical EO profiles, which could not be captured by the mean comparison approach used in the regression analysis. Three EO configurations emerged among agripreneurs in South Kivu based on their responses to the risk-taking, innovation, and proactivity scales: Cluster 1 had low entrepreneurial orientation (Risk = 2.40; Innovation = 2.37; Proactivity = 2.72), Cluster 2 was characterized by high risk-taking (3.91) but a low level of innovation (1.47) and Cluster 3 had a high entrepreneurial orientation (Innovation = 3.67; Proactivity = 3.33; Risk-taking = 3.76) (Figure 6).

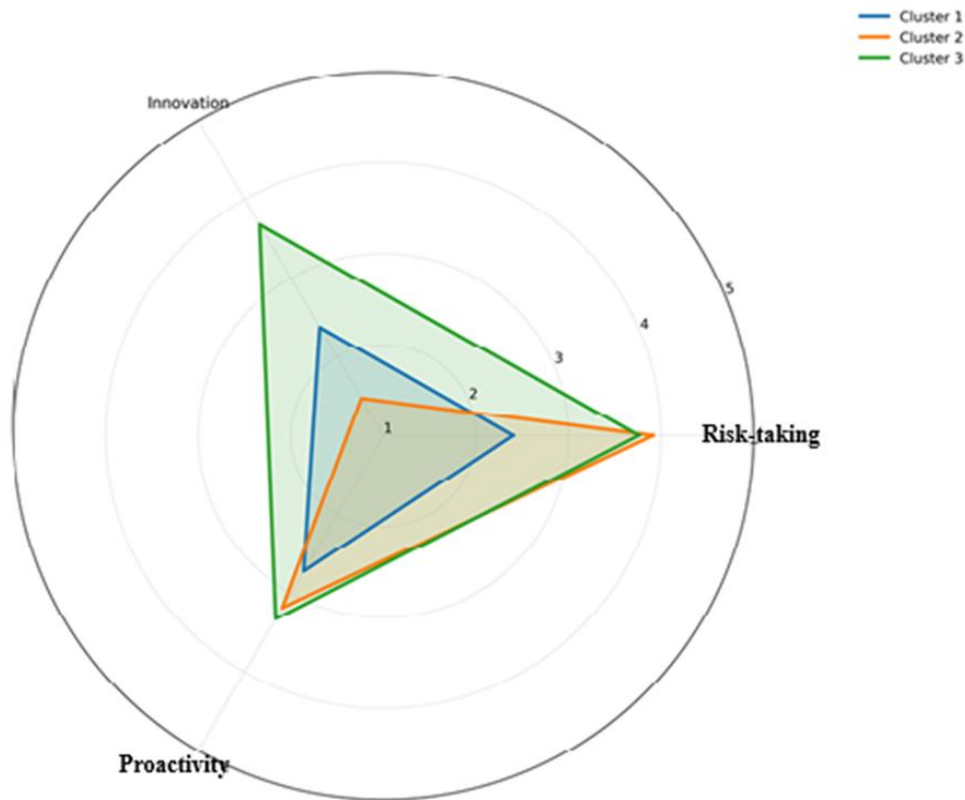


Figure 6. Elbow and Silhouette Model. Authors' conceptualization.

The interpretation of the results was based on the visual inspection of boxplots, which highlight the interitem variability [Figure 7(a)] and medians [Figure 7(b)]. As expected, K metrics progressively improved with an increase in the number of clusters. More specifically, the intracluster variation (inertia) decreased mechanically as K increased, while the silhouette coefficient, used to evaluate the quality of partitions, was maximized at $K = 4$, but the three-cluster solution ($K = 3$) was selected as the best option to balance the quality of partitions and parsimony. This decision aligns with methodological recommendations that emphasize triangulating multiple criteria rather than relying on a single metric, thereby ensuring the theoretical relevance of the identified segments [81–83].

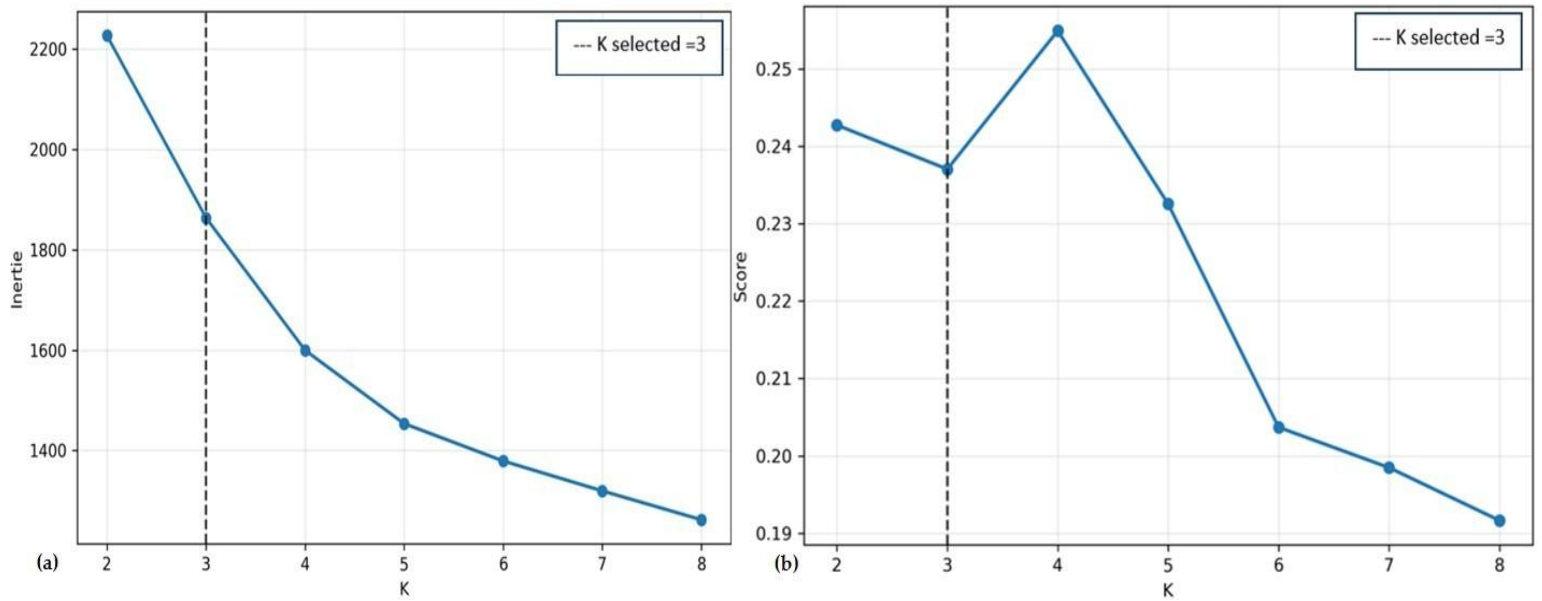


Figure 7. (a) Elbow inertia figure, and (b) Silhouette figure. Author's conceptualization.

The boxplots further revealed that differences between clusters were primarily driven by risk-taking and innovation. For instance, while boxplots for risk-taking did not overlap between Cluster 1 and Clusters 2 and 3, those for innovation showed that Cluster 3 differed from Cluster 2 and was in between Cluster 1 and Cluster 3 [Figure 8(a) and 8(b)]. Proactivity also discriminated between Cluster 1 and the other two clusters but to a lesser extent [Figure 8(c)].

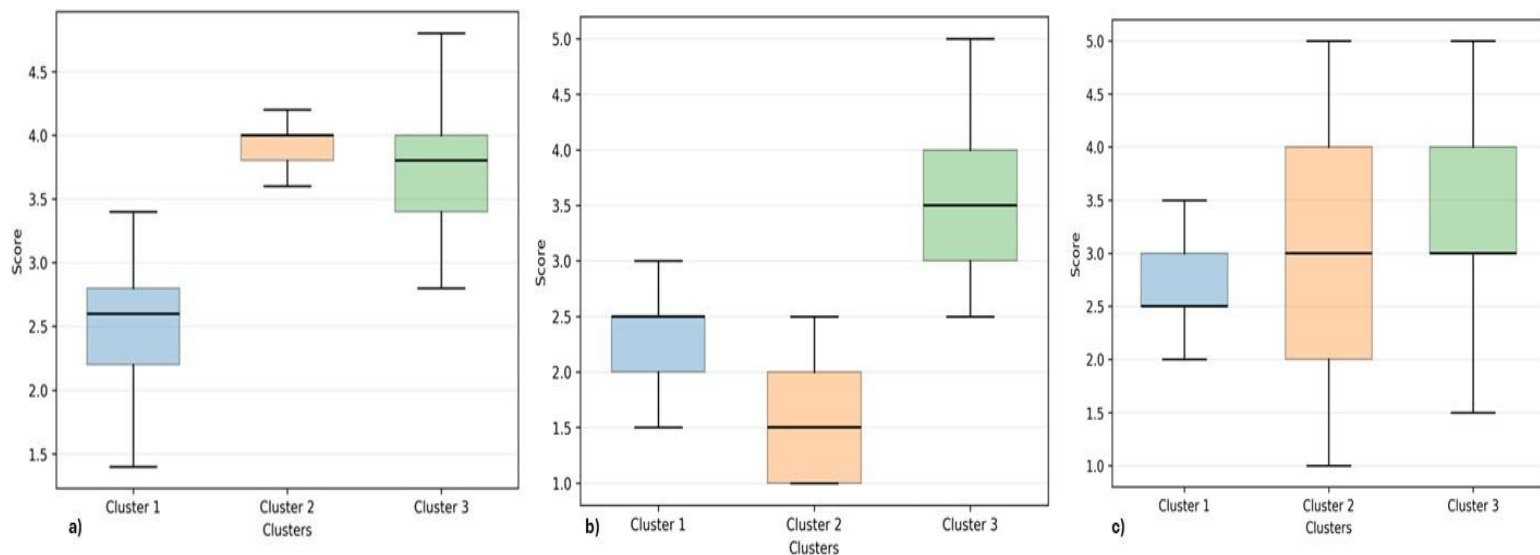


Figure 8: Differentiation between clusters driven by risk-taking and innovation score with: a) Risk taking score, b) Innovation score, c) Pro activity score.

3.5. Determinants of the Entrepreneurial Orientation (EO) among youths in agribusiness

The results in Table 6 revealed determinants of entrepreneurial orientation (EO) among youths in agribusiness. Socio-economic and demographic variables were significant predictors of EO, but their impact varied across the three identified clusters. The predictive power of the set of predictors also varied across clusters, being the strongest in Cluster 3 ($R^2 = 0.620$). Gender was a significant determinant of EO in the overall sample and in Cluster 1. The positive coefficient indicated that males had a higher entrepreneurial orientation than females. This could be explained by the fact that men are more likely to embrace entrepreneurial roles than women because of their relative independence and social expectations. The results further revealed that education level was a significant determinant of EO among youths in agribusiness. Specifically, the coefficients for secondary education and postgraduate studies were negative and significant in most of the models. Compared to youths with undergraduate education, those with secondary education and postgraduate studies had a lower entrepreneurial orientation. Similar observations were made in Cluster 2 and 3 with reference to master's degree. These results suggest that more educated youths are likely to opt for formal employment [23]. Another possible explanation is that entrepreneurial activity in the study area is necessity-driven [8]. Marital status was a significant determinant of EO in the overall sample and in Cluster 1. Youths in the married category had a higher entrepreneurial orientation than their unmarried counterparts. This could be explained by the fact that marriage increases the likelihood of engaging in entrepreneurial activities to generate additional income to supplement the family needs. Parental occupation also had a positive and significant effect on the entrepreneurial orientation of the youths in the overall sample. Youths whose parents were entrepreneurs had higher entrepreneurial orientation than those whose parents were employed in formal companies. This suggests that children learn entrepreneurial skills from their parents and have better knowledge of the business environment, which makes them more likely to engage in entrepreneurial activities [85]. Income had no significant effect on the entrepreneurial orientation of the youths in agribusiness. The results further revealed that social networks had a significant positive effect on the entrepreneurial orientation of the youths [79]. In fact, social networks seemed to be the most critical predictor of EO, particularly in Cluster 3. It is argued that social

networks facilitate access to information, opportunities, funding, partners, and advice, which are particularly useful in the entrepreneurial process, especially in the absence of formal support. The differences in the effect sizes further suggest that social networks could not be the sole determinant of EO as the youths in different clusters reacted differently to the same set of predictors. Similarly, the effect sizes suggest that Cluster 3 had the most significant explanatory power, whereas education seemed to be a more critical predictor of EO in Cluster 2. These findings highlight the fact that different entrepreneurial segments require different interventions for sustainable development.

Table 6. The linear regression on determinants of Entrepreneurial Orientation

Dependent variable :	Overall	Cluster 1	Cluster 2	Cluster 3
Entrepreneurial Orientation (EO)	EO	EO	EO	EO
Age	-0.0100 (0.00924)	-0.00913 (0.0118)	-0.00151 (0.0160)	0.00375 (0.0100)
Gender (Male = 1)	0.352*** (0.0630)	0.193*** (0.0722)	0.142 (0.109)	0.169 (0.114)
Education level (Secondary)	-0.894*** (0.105)	-0.508 (0.409)	-0.773*** (0.257)	-0.221** (0.0890)
Education level (Postgraduate)	-0.810*** (0.100)	-0.234 (0.406)	-1.009*** (0.253)	-0.363*** (0.0782)
Education level (master's degree)	-0.378 (0.255)	- -	-1.529*** (0.533)	-0.121 (0.153)
Marital status (Married = 1)	0.179*** (0.0690)	0.202** (0.0880)	0.122 (0.119)	0.0641 (0.0732)
Parents' professional status	0.107* (0.0596)	0.0671 (0.0725)	-0.0620 (0.0949)	0.0485 (0.0838)
Income	0.0119 (0.0284)	0.0356 (0.0363)	0.0527 (0.0572)	0.0267 (0.0256)
Social network	0.153** (0.0669)	-0.142 (0.101)	0.0202 (0.107)	0.234*** (0.0712)
Constant	3.455***	2.801***	3.589***	3.244***

	(0.283)	(0.527)	(0.531)	(0.279)
Observations	340	135	116	89
R-squared	0.415	0.197	0.229	0.620

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0. *Authors' computation.*

The results in Table 7 identified the main constraints faced by entrepreneurs in the agribusiness sector. The five most significant barriers to entrepreneurial activities in the agribusiness sector were the lack of technical support, limited social networks, inadequate access to land, the absence of mentors and coaches, and finally, the lack of experience exchange networks. Lack of technical support was the primary hindrance to youth entrepreneurship in agribusiness. The second, third, and fourth constraints were the limited social networks, inadequate access to land, and lack of mentors and coaches, respectively. The fifth most significant barrier to entrepreneurial activities in the agribusiness sector was the absence of experience exchange networks for young entrepreneurs [86,87]. Due to the absence of adequate networks, young entrepreneurs in South Kivu find it challenging to connect with peers and participate in agribusiness activities hosted by associations or incubators [32,50]. Although some training programs (e.g., those provided by PICAGL) exist, they are mostly short-term and discontinuous and do not allow for continuous mentoring and coaching [22]. As a result, young entrepreneurs are unable to consolidate their knowledge and transform their ideas into viable products and services. Most young entrepreneurs come up with innovative ideas but do not have the technical know-how to make their products and services competitive. Without mentoring and coaching, their products and services fail to meet the required standards, hindering their access to finance and recognition.

Table 7. Ranking of barriers encountered by youth agripreneurs

Barriers	Average	Standard deviation	Min.	Max.	Rank
Lack of access to agricultural loan & funds/finance among Start-ups	3.329	1.365	1.000	6.000	8
Lack of technical support	5.165	1.167	1.000	6.000	1
Lack of networking	4,700	1.219	1.000	6.000	2
Lack of mentor and/or coach	3,924	1.153	1.000	6.000	4
Hardship hindering access to land	3,935	1.075	1.000	6.000	3

Administrative constraints	3,235	1.430	1.000	6.000	10
Lack of skilled labor	3,091	1.326	1.000	6.000	11
Supply of raw materials and inputs	2,479	1.353	1.000	6.000	13
Lack of equipment	3,579	1.318	1.000	6.000	7
Poor managerial knowledge	2,706	1.442	1.000	6.000	12
Lack of network for experience sharing	3,791	1.093	1.000	6.000	5
Taxation	3,318	1.543	1.000	6.000	9
Lack of linkages & Market related constraints	3,671	0.993	1.000	6.000	6

Source: authors' computation.

The results in Table 8 identified the most significant factors encouraging young entrepreneurs to engage in entrepreneurial activities in the agribusiness sector. Training was the most significant factor encouraging youths to participate in entrepreneurial activities in the agribusiness sector. The second most influential factor was knowledge of a specific project, while the third most significant predictor was previous experience [8].

Table 8. The Origin of the idea of creating an agribusiness

Who/What prompted your idea to start your own agribusiness	Average	Standard deviation	Min	Max	Rank
Information from a Friend	3.100	1.492	1.000	6.000	4
Youth Training in Agribusiness	3.732	1.678	1.000	6.000	1
Knowledge of a project	3.594	1.471	1.000	6.000	2
Professional circle	2.256	1.554	1.000	6.000	6
Family relative(s)	2.482	1.362	1.000	6.000	5
From a journey	1.712	1.299	1.000	6.000	7
Previous experience	3.135	1.431	1.000	6.000	3

Source: authors' computation.

3.6. Adaptation steps/moves used by youths in agribusiness

The results in Table 9 revealed the adaptation steps/moves used by youths in agribusiness. The first move was to “be always on the watch to grab any business opportunity ahead of others” (proactivity), which was the most widely practiced adaptation move. The second adaptation step was to “remain calm when facing any hardship” (risk-taking), followed by the third adaptation move of “develop a new

product with improved quality” (innovation). The fourth adaptation step involved participation in various competitions organized in the locality and targeting young agripreneurs (proactivity).

Table 9. The adaptation moves used by youths in agribusiness

Adaptation steps/moves used	Average	Standard deviation	Min	Max	Rank
To create a new product and improve produce quality (Innovation)	3.874	1.386	1.000	6.000	3
To be keen on – and alert to grab – business opportunities that are not obviously perceived by others (Proactivity)	4.103	1.219	1.000	6.000	1
To stay calm when facing hardships (Risk-taking)	3.879	1.408	1.000	6.000	2
To revert to Family and friends’ support for a loan	2.606	1.426	1.000	6.000	6
To take part in various competitions organized in the area and involve/targeting young agro-entrepreneurs (Proactivity)	3.800	1.284	1.000	6.000	4
To take out a loan from an MFI or a bank	2.318	1.588	1.000	6.000	7
To liaise with private associations for support	3.256	1.529	1.000	6.000	5

Source: authors’ computation.

4. Discussion

Entrepreneurial orientation (EO) has been considered an excellent predictor of job creation, poverty alleviation, and economic renewal [80]. This study revealed that most youths experience several challenges as they engage in EO processes. The main barriers to entrepreneurial activities in the agribusiness sector were the lack of technical support, limited social networks, inadequate access to land, the absence of mentors and coaches, and finally, the lack of experience exchange networks. These findings provide practical implications for promoting wealth creation and employment through entrepreneurial activities. The results further revealed that training was the most significant predictor of youths’ encouragement to engage in entrepreneurial activities in the agribusiness sector. Similar findings were reported by incubator managers, who identified limited networking, mentoring, coaching, land, and equipment as the main barriers to youth entrepreneurship [32,52]. A young entrepreneur who “keeps to him/herself” (i.e., operates in a vacuum) is highly likely to disappear from the market.

Youths mainly rely on close relatives and friends to provide financial support. Operational youth agripreneurs are more likely to receive financial support from family members due to the creditworthiness of their activities, compared to idle youths. It is argued that family, professional, and social networks provide information, credit, and administrative support to facilitate the launch of projects [87]. The study further revealed that management training was the most potent factor encouraging youths to participate in entrepreneurial activities in the agribusiness sector. After training, some youths are capacitated and ready to identify business opportunities and develop business models [20,88].

This study revealed that entrepreneurial orientation (EO) among youths in agribusiness is a multidimensional construct that consists of three dimensions, namely, risk-taking, innovation, and proactivity. Together, the three dimensions explained 71.5% of the variance in entrepreneurial orientation among youths in agribusiness. The first dimension, risk-taking comprised of 5 items and explained 35.8% of the variance in entrepreneurial orientation among youths in agribusiness. The items had factor loadings ranging from 0.649 to 0.846 on the first component. Specifically, the following items had moderately strong to very strong relationships with entrepreneurial orientation: “I often like trying new and unusual activities that are not typical but not necessarily risky,” and “I favor experimentation and original approaches to problem-solving rather than using methods generally used by others.” The second component, proactivity, comprised of two items and explained 17.9% of the variance in entrepreneurial orientation among youths in agribusiness. The items had factor loadings ranging from 0.873 to 0.898 on the second component. The third component, innovation, comprised of two items and explained 17.7% of the variance in entrepreneurial orientation among the respondents. Overall, all the items had acceptable representation levels.

This study identified three entrepreneurial orientation (EO) clusters among the young agripreneurs: (1) low risk-taking and moderate innovation, (2) high risk-taking but very low innovation, and finally, (3) high risk-taking, high innovation, and high proactivity. The results further revealed that the main determinants of entrepreneurial orientation (EO) among youths in South Kivu were education, age, gender, income, marital status, and social networks. Overall, there was a positive and significant relationship between

entrepreneurial orientation and its determinants. Specifically, entrepreneurial orientation increased with increases in the level of education, age, gender, income, and marital status. Income had a positive and significant effect on entrepreneurial orientation, suggesting that youths with higher income had a greater entrepreneurial orientation compared to their lower-income counterparts. Gender had a positive and significant effect on entrepreneurial orientation, suggesting that male youths had a higher entrepreneurial orientation than their female counterparts. This could be explained by the fact that women are more risk-averse and less likely to adopt innovations compared to men, a notion that has been supported by several studies [34]. In practice, men are likely to seek external opinions before pursuing entrepreneurial activities, whereas women are more likely to seek the opinions of their spouses. Marital status also had a positive and significant effect on entrepreneurial orientation. Youths who were married had a higher entrepreneurial orientation compared to those who were unmarried. This could be explained by the fact that married youths have additional financial responsibilities that compel them to pursue entrepreneurial activities to supplement their income. On the other hand, parental occupation had a positive and significant effect on the entrepreneurial orientation of the youths.

Youths whose parents were entrepreneurs had a higher entrepreneurial orientation compared to youths whose parents were employed in formal companies. This suggests that youths learn entrepreneurial skills from their parents and have a better understanding of the business environment, which makes them more likely to pursue entrepreneurial activities [23,89]. This study revealed that most young entrepreneurs in the agribusiness sector in South Kivu had participated in at least one managerial training program in their careers. This was evident from the high mean score recorded for the item measuring the extent to which young entrepreneurs had participated in training programs (Mean = 3.30 on a 5-point Likert scale). This finding was consistent with the results of a study conducted by [90], who revealed that many business owners in Ghana, Tanzania, Ethiopia, and Kenya had participated in managerial training programs. Nevertheless, the training programs barely covered essential aspects of managing a business, such as bookkeeping and record management, organization, and marketing [90].

According to Ernst & Young's study of 1,500 entrepreneurs in developing countries [46], cultural beliefs were significant barriers to entrepreneurial activities in the

agribusiness sector. Specifically, the survey identified the perception of an entrepreneur as being lower than that of a conventional employee and a general intolerance of failure as the main cultural barriers to entrepreneurial activities in the agribusiness sector. Being related to sustainable development goals (SDGs), entrepreneurial orientation (EO) can be seen as a way for enterprises to address social, economic, and environmental challenges by responding to innovation, proactiveness, and risk-taking rather than only short-term performance [91,92]. Education enables youths to acquire the skills and knowledge necessary to transform business ideas into viable enterprises. Prior experience enables youths to understand the intricacies of the agribusiness sector and, therefore, increases the likelihood that they will pursue entrepreneurial activities. In addition, youths with prior experience are more likely to make informed business decisions, which increases the chances of their enterprises' survival and growth. The study further revealed that most young entrepreneurs in the agribusiness sector used the following adaptation strategies to overcome the adverse effects of limited technical support, social networks, and mentoring and coaching: (1) be always on the watch to grab any business opportunity ahead of others, (2) remain calm when facing any hardship, and (3) develop a new product with improved quality. In short, young entrepreneurs in South Kivu are willing to take risks and adopt innovative strategies to ensure the survival and growth of their enterprises [89] .

According to [80], entrepreneurial orientation promotes enterprise performance because innovative behaviors are critical for the survival of small- and medium-sized enterprises (SMEs). Unlike large enterprises, SMEs have limited resources to withstand the test of time and, therefore, need to identify and exploit new opportunities to improve performance and gain an advantage over their competitors. An emerging view in entrepreneurship research links EO to the overarching sustainable-development agenda [93,94]. Studies report that EO can drive small-and medium-sized enterprises (SMEs) towards community development and socially and environmentally responsible behaviors [95]. The findings further revealed that the entrepreneurial orientation of young entrepreneurs in the agribusiness sector was not homogenous; rather, the young entrepreneurs exhibited a wide range of entrepreneurial behaviors. Some youths were more innovative, whereas others embraced proactivity and risk-taking as adaptation strategies to the hostile business

environment. The main determinants of entrepreneurial orientation were social networks, gender, education, and marital status. In addition, limited technical support and mentoring and coaching were major barriers to youth entrepreneurship. Hence, the findings revealed that different segments of young entrepreneurs require different interventions, and therefore, policymakers and other stakeholders need to promote differentiated strategies to promote youth entrepreneurship.

5. Study Limitations, Theoretical, empirical and Policy contribution

This study contributes to entrepreneurial orientation (EO) and business strategy literature in three main areas. First, this study advances the literature by demonstrating that innovation, proactivity, and risk-taking could combine to form unique strategic configurations of EO among young agripreneurs. Besides adding to the theoretical underpinnings of EO, this study provides an empirical validation of the person-centered approach to analyzing entrepreneurial data. By demonstrating that similar sets of institutional conditions could lead to different patterns of entrepreneurial behavior, this study adds another layer to the EO theory while simultaneously expanding the scope of application of the person-centered approach. Second, this study bridges the gap in the literature by situating EO within the context of a fragile economy. By establishing the socioeconomic, social network, resource, and institutional determinants of EO, this study highlights the importance of context in influencing entrepreneurial behavior. Third, this study integrates EO with business constraints and adaptation strategies to reveal the mechanisms through which EO facilitates enterprise survival. In other words, proactivity, calculated risk-taking, and innovation are not only entrepreneurial behaviors but also adaptation strategies that enable entrepreneurs to overcome the hostile business environment and, consequently, promote enterprise survival. By drawing on the Theory of Planned Behavior (TPB) [34] and Reasoned Choice Theory (RCT) [34], this study reveals the key predictors of EO among young agripreneurs in South Kivu. The findings provide practical implications for promoting entrepreneurial activities among young agripreneurs in South Kivu and, by extension, other similar socio-cultural and economic environments.

These contributions should be considered in the context of the following limitations. First, this study used a cross-sectional design, which limited the ability to establish causal relationships between the predictors and EO. A longitudinal research design

would have been more appropriate in this study since it would have allowed the researchers to track changes in the variables of interest and, consequently, establish causal relationships. Future studies could use a mixed-methods and comparative research design to explore the variations in EO and business strategies in different regions. Future studies could also focus on studying the relationship between the key predictors of EO and enterprise performance, specifically in terms of enterprise survival rates, growth rates, employment rates, and levels of innovation. This focus on EO in SMEs in vulnerable agrifood systems is particularly relevant since their survival and ability to generate employment and sustain livelihoods are at stake, as well as their ability to adapt to natural, human, and institutional constraints. Finally, future studies could replicate this study in other similar contexts to determine whether the findings are consistent across different settings.

6. Conclusions and recommendations

This study examined the determinants of entrepreneurial orientation (EO) among youths in agribusiness in South Kivu, identifying the constraints faced by small- and medium-sized enterprises (SMEs) in the agribusiness sector and the adaptation strategies used by young entrepreneurs to overcome the hostile business environment. Using exploratory factor analysis (EFA), cluster analysis, partial least squares (PLS) structural equation modeling, linear regression, and descriptive analysis, this study revealed the factors influencing EO, as well as the adaptations used by young entrepreneurs in South Kivu. Based on the Theory of Planned Behavior (TPB) and Reasoned Choice Theory (RCT), this study revealed that education, age, gender, income, marital status, and social networks were the key determinants of EO, thus partially supporting the study's hypotheses (H1). EO had a positive and significant relationship with its determinants, which were significant predictors of EO, thus supporting hypothesis (H2). This study further identified the main constraints faced by young entrepreneurs in the agribusiness sector and the adaptation strategies used by young entrepreneurs in the agribusiness sector. The findings revealed that EO among youths in agribusiness in South Kivu is a multidimensional construct comprising of risk-taking, innovation, and proactivity. Risk-taking explained 35.8% of the variance in EO, proactivity explained 17.9%, while innovation explained 17.7% of the variance in EO. Young entrepreneurs in the agribusiness sector in South Kivu used three adaptation strategies to overcome the adverse effects of limited technical support, social

networks, and mentoring and coaching: (1) be always on the watch to grab any business opportunity ahead of others, (2) remain calm when facing any hardship, and (3) develop a new product with improved quality. These adaptation strategies were significant predictors of enterprise performance, thus supporting hypothesis (H3). In short, this study revealed several challenges influencing the entrepreneurial orientation of young agripreneurs in South Kivu and the adaptation strategies used by young entrepreneurs to overcome these challenges. These findings have significant policy implications, as policymakers and other stakeholders need to address the issues affecting young entrepreneurs in South Kivu.

7. Recommendations

Based on the findings, this study recommended that policymakers and relevant stakeholders pay more attention to young entrepreneurs in South Kivu by providing technical support and skills to enhance their competencies and, consequently, increase their chances of having successful enterprises. As such, youth entrepreneurial orientation can be a driver of inclusion-oriented economic development and resilient agrifood systems, contributing to achieving several SDGs, including 1, 2, and 8 at local levels. Policymakers and other stakeholders need to promote the establishment of social networks to facilitate knowledge sharing, mentoring, and coaching, which will ultimately promote entrepreneurial activities among young entrepreneurs. Additionally, policymakers need to consider providing credit facilities to support young entrepreneurs in starting and running their enterprises. Such interventions are likely to have a multiplier effect as successful young entrepreneurs will encourage others to start businesses, thereby promoting economic development and increasing employment figures. Policymakers need to develop policies that foster differentiated strategies to address the needs of different segments of young entrepreneurs. Stakeholders involved in youth entrepreneurship development should invest more in mentorship, coaching, and incubation programs to empower young entrepreneurs. Policymakers should focus on facilitating networking activities and encouraging youths to participate in workshops and seminars on entrepreneurship development to promote the exchange of ideas and skills. Policymakers should also consider addressing the issue of youths' access to land and technical support, as well as promoting access to agribusiness finance to support youth entrepreneurship.

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Authors' contributions

Conceptualization, G.S.; and F.B.; methodology, C.C., R.Z., G.S.; software, E.M., G.S. and P.M.; validation, CC., B.H., R.Z., L.N. and M.D.; formal analysis, P.M. and G.S.; investigation, F.B.; resources, L.N.; data curation, P.M.; writing-original draft preparation, F.B., G.S.; writing-review and editing, H.S., B.H., A.A., R.Z., C.C.; visualization, E.M., B.H., A.A., G.S., C.C.; supervision, A.A., L.N; project administration, L.N.; funding acquisition, A.A. All authors have read and agreed to the published version of the manuscript.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Availability of data and materials

Data will be made available on request.

Declaration of generative AI in the writing process

During the preparation of this work, the authors utilized Microsoft Copilot and ChatGPT to enhance the readability of their initial manuscript. Thereafter, the content was reviewed and edited as necessary. The authors thus take full responsibility for the publication's content.

Ethics approval

Ethics approval to conduct the study was obtained from the International Institute of Tropical Agriculture (IITA) Internal Review Board (IRB).

Consent to participate

Verbal informed consent was obtained from all participants after they were informed that responses would remain confidential and that participation was voluntary. They were also assured that they could withdraw from the study at any time without providing reason.

Institutional Review Board Statement

The study was conducted according to the guidelines of the International Institute of Tropical Agriculture (IITA) Internal Review Board (IRB).

Informed consent Statement

Informed consent was obtained from all participants involved in the study.

Competing interests

The authors declare that there are no conflicts of interest.

Consent to publish

Not applicable

Abbreviations

The following abbreviations are used in this manuscript:

EO	Entrepreneurial Orientation
DRC	Democratic Republic of the Congo
EFA	Exploratory Factor Analysis

PLS	Partial Least Squares
MSMEs	Micro Small and Medium Enterprises
TPB	Theory of Planned Behavior
RBV	Resilience theory and the Resource-Based View
IITA	International Institute of Tropical Agriculture
STEP	Start Them Early Program
IYA	IITA Youth in Agribusiness
NGOs	Non-Governmental Organizations
MASL	Meters Above Sea Level
PEJAB	Agriculture and Agribusiness Youth Entrepreneurship Project
AfDB	African Development Bank
PICAGL	the Integrated Project on Agricultural Growth in the Great Lakes region
ANADEC	National Agency for the Development of Entrepreneurship and Job Creation
OHADA	the Organization for the Harmonization of Business Law in Africa
ODK	Open Data Kit (ODK)
KMO	Kaiser-Meyer-Olkin
CFA	Confirmatory factor analysis

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