

Bridging the Digital Divide: The Role of Human Capital in Enhancing the Impact of Fintech on Agripreneur Performance in Cameroon's Agricultural Value Chains

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ABSTRACT

This study examined whether human capital determines the extent to which agripreneurs benefit from fintech in Cameroon. A cross-sectional survey design was employed, and data were collected from 420 agripreneurs using structured questionnaires. Multiple regression and hierarchical regression analyses were conducted to test the hypotheses. The findings revealed that human capital dimensions, including education, digital literacy, financial literacy, and entrepreneurial skills, have statistically significant and positive effects on agripreneur performance in Cameroon, with digital literacy demonstrating the strongest contribution. Furthermore, human capital significantly moderated the relationship between fintech adoption and agripreneur performance, such that the positive effects of fintech adoption on performance were amplified among agripreneurs with higher levels of human capital. Simple-slope analysis confirmed that the fintech-performance relationship was positive and significant at high and medium levels of human capital but non-significant at low levels. The study recommends integrated interventions that combine fintech access with comprehensive human capital development programmes, including digital literacy training and financial education, to enhance agripreneurs' performance across Cameroon's agricultural value chains.

Keywords: Agricultural value chains, Agripreneur performance, Cameroon, Digital divide, Fintech adoption, Human capital

INTRODUCTION

The agricultural sector constitutes the backbone of Cameroon's economy (Tambi and Fosah, 2024). The sector employs a substantial proportion of the active population and contributes significantly to the nation's Gross Domestic Product (GDP). Recent data indicates that agriculture employed approximately 41.85% of Cameroon's workforce in 2025, a figure that has declined from previous decades as the economy undergoes structural shifts toward services and industry (World Bank, 2025; International Labour Organization (ILO), 2025). The agricultural sector's contribution to GDP was approximately 18.46% in 2024, reflecting its continued importance to the national economy (TheGlobalEconomy.com., 2024). According to Cameroon's National Institute of Statistics, the primary sector contributed 0.6 percentage points to GDP growth in the first quarter of 2024, driven by performance in subsistence agriculture and industrial export agriculture (Institut National de la Statistique du Cameroun, 2024). Despite this substantial contribution, the sector faces persistent challenges including limited access to financial services, inadequate infrastructure, and constrained market linkages that impede the performance of agripreneurs across various value chains. The emergence of financial technology (fintech) presents transformative opportunities to address these challenges by providing innovative solutions for payments, savings, credit access, and market information dissemination (Ahmad, 2020; Ndung'u, 2022; Hikouatcha et al., 2026). Nevertheless, the potential of fintech to enhance agripreneur performance remains contingent upon the existence of adequate human capital capable of effectively leveraging these digital tools.

The digital divide in Cameroon manifested through disparities in access to and utilisation of digital technologies between urban and rural populations, as well as across different socioeconomic groups (Penard et al., 2015). While Cameroon has witnessed rapid adoption of mobile wallets in urban areas like Douala and Yaoundé, rural regions face significant limitations in infrastructure and digital literacy, with gender disparities remaining prominent in mobile wallet use (United Nations Development Programme (UNDP), 2024). This observation aligns with research demonstrating that when financial or material support is provided to entrepreneurs without accompanying capacity building, the sustainability of such interventions remains questionable (Hamunyela, 2025). The digital divide in Cameroon is further characterised by a two-speed digital transformation, where urban centres enjoy high internet penetration rates while rural areas remain marginalised, with only 43.9% of the population having internet connectivity (Nchake, 2023).

Human capital, encompassing education, skills, experience, and competencies, emerges as a fundamental determinant of technology adoption and productive utilization (Unger et al., 2011). Agripreneurs possessing higher levels of human capital demonstrate greater capacity to understand, adopt, and effectively employ fintech solutions to enhance their business operations. The interaction between human capital and fintech adoption creates a dynamic where investments in education and skills development amplify the benefits derived from technological innovations.

Cameroon's agricultural value chains, spanning production, processing, marketing, and distribution, present diverse opportunities for fintech interventions. Each stage of these value chains presents unique challenges that fintech solutions might address, contingent upon the human capital capabilities of participating agripreneurs. The effectiveness of fintech in improving access to finance, enabling secure transactions, facilitating market linkages, and providing real-time information depends significantly on the digital competencies and financial literacy of users. Hence, this study undertakes the initiative to examine the influence of human capital on the relationship between fintech adoption and agripreneur performance across Cameroon's agricultural value chains.

Statement of the Problem

Despite the proliferation of fintech solutions in Cameroon's agricultural sector, agripreneur performance remains suboptimal, raising questions about the effectiveness of these technological interventions. The anticipated benefits of fintech adoption, including improved access to finance, enhanced market connectivity, and increased operational efficiency, have not materialised uniformly across agripreneurs. This disparity suggests that factors beyond technology availability influence the relationship between fintech adoption and agripreneur performance.

Observations from entrepreneurial support programmes indicate that providing financial or material resources without addressing capability gaps often yields limited and unsustainable outcomes (Hamunyela, 2025). Many agripreneurs lack the requisite digital literacy, financial management skills, and business acumen necessary to maximise the benefits of fintech adoption. This human capital deficit constitutes a significant barrier to realising the transformative potential of fintech in Cameroon's agricultural sector.

The nature of the relationship between human capital, fintech adoption, and agripreneur performance across Cameroon's value chains remains inadequately understood. Specifically, the extent to which human capital moderates the impact of fintech on agripreneur performance, and the differential effects across various value chain stages and geographical contexts, require systematic investigation. Addressing this knowledge gap is essential for designing effective interventions that enhance agripreneur capabilities and optimise the benefits of fintech adoption.

Furthermore, the heterogeneous nature of agricultural value chains in Cameroon necessitates nuanced analysis of how human capital-fintech interactions manifest across different contexts. Value chains differ in their structure, requirements, and technological intensity, suggesting that the influence of human capital on fintech effectiveness may vary accordingly. Understanding these contextual variations is crucial for developing targeted strategies that address specific needs and constraints within each value chain.

Research Objectives and Hypotheses for the Study

This research study objectives and hypotheses are stated under the following subheadings;

Research Objectives for the Study

Objective One: To examine the relationship between human capital dimensions (education, digital literacy, financial literacy, and entrepreneurial skills) and agripreneur performance in Cameroon's agricultural value chains.

Objective Two: To assess the moderating role of human capital in the relationship between fintech adoption and agripreneur performance in Cameroon's agricultural value chains.

Research Hypotheses for the Study

The following hypotheses have been stated in the alternate form as follows:

Hypothesis 1, Ha: There is a significant positive relationship between human capital dimensions (education, digital literacy, financial literacy, and entrepreneurial skills) and agripreneur performance in Cameroon's agricultural value chains.

Hypothesis 2, Ha: Human capital significantly moderates the relationship between fintech adoption and agripreneur performance in Cameroon's agricultural value chains.

LITERATURE REVIEW

Conceptual Review

Human Capital: Human capital refers to the collective knowledge, skills, competencies, and abilities that individuals possess and which enable them to perform productive activities. The concept, as defined by Becker (1964), encompasses the experience, skills, and knowledge that can accumulate to become sustainable capital stock. Schultz (1961) stated that skills and knowledge should be regarded as forms of capital, and that education is an investment that yields economic benefits for societies and individuals. In the context of agripreneurship, human capital encompasses formal education, vocational training, experiential knowledge, digital literacy, financial literacy, and entrepreneurial capabilities. The concept, as understood in this study, extends beyond basic literacy to include specialised competencies required for operating effectively in technology-mediated agricultural value chains. Human capital represents a critical resource that enables agripreneurs to identify opportunities, make informed decisions, adopt innovations, and manage business operations efficiently (Unger et al., 2011; Xayavong et al., 2016; Tengapoe et al., 2024). The development of human capital through education, training, and experiential learning constitutes a fundamental pathway for enhancing agripreneur performance and ensuring the sustainability of technology interventions.

Fintech: Financial technology, commonly referred to as fintech, encompasses a broad range of technological innovations that deliver financial services through digital platforms (Kishor et al., 2025; Wei, et al., 2025; Koomson et al., 2026). In the agricultural context, fintech solutions include mobile money services, digital payment systems, online lending platforms, crop insurance applications, and market information systems accessible through mobile devices. According to the United Nations Development Programme (2024); and Mapanje et al. (2023), digital financial inclusion has been recognised as a crucial tool to bridge the financial gap in underserved regions, leveraging mobile wallets to improve access to financial services. Research by the International Food Policy Research Institute has demonstrated that digital financial technologies hold promises for expanding credit access in agrifood systems, with the potential to extend availability and reduce transaction costs in rural areas where in-person financial services are limited or absent (Ambler et al., 2025). These technologies have transformed financial service delivery by reducing transaction costs, extending reach to underserved populations, and providing real-time information that facilitates informed decision-making. The relevance of fintech to agripreneurs lies in its capacity to address traditional barriers to financial inclusion,

including geographical distance, documentation requirements, and collateral constraints. However, the effectiveness of fintech solutions depends substantially on the capabilities of users to navigate digital interfaces, understand financial products, and integrate these technologies into business operations.

Agripreneur Performance: Agripreneur performance refers to the multidimensional outcomes of agricultural entrepreneurial activities, encompassing financial returns, operational efficiency, market access, productivity, and business sustainability (Okello., 2026; Shittu et al., 2025; Appiagyei et al., 2026). In the context of this study, performance is conceptualised as a composite construct that includes profitability, revenue growth, cost efficiency, market share expansion, and innovation adoption (Molua, 2005; Tabe-Ojong & Molua, 2017; Mbarga Evouna et al., 2024). Agripreneur performance serves as the dependent variable of interest, representing the ultimate measure of success in agricultural value chain participation. The determinants of agripreneur performance are multifaceted, including individual characteristics, business capabilities, environmental factors, and technological adoption. Understanding the factors that influence performance is essential for designing interventions that enhance agricultural productivity and sustainability.

Digital Divide: The digital divide refers to the gap between individuals, households, businesses, and geographic areas at different socioeconomic levels with regard to their opportunities to access information and communication technologies and their use of the internet for a wide variety of activities (Scheerder et al., 2017). In Cameroon, the digital divide manifests along urban-rural lines, between gender groups, across age cohorts, and among different socioeconomic strata. Research indicates that rural regions face limitations in infrastructure and digital literacy, with gender disparities prominent in mobile wallet use (United Nations Development Programme, 2024). According to the International Trade Administration (2026), low digital literacy, especially in rural areas and among women, along with limited access to ICT education and language barriers, further exacerbates the issue. The concept encompasses both access to digital infrastructure and the capabilities required to effectively utilise digital technologies (Kouladoum et al., 2022). Bridging the digital divide requires addressing both supply-side constraints, such as infrastructure and affordability, and demand-side factors, including digital literacy and relevant content (Quibria et al., 2003). The persistence of the digital divide has significant implications for the equitable distribution of fintech benefits across agripreneurs (Mignamissi & Djijo, 2021; Odei-Appiah et al., 2022).

Agricultural Value Chains: Agricultural value chains encompass the full range of activities, actors, and processes involved in bringing agricultural products from production to final consumption. These chains include input supply, production, post-harvest handling, processing, marketing, distribution, and consumption of agricultural products (Mbarga Evouna et al., 2024; Assoua et al., 2022). According to Ambler et al. (2025), income growth and urbanisation are driving changes in agrifood value chains in many low- and middle-income countries, expanding business opportunities for individuals and firms involved in moving food from rural to urban areas. The value chain midstream has been identified as a promising entry point for efforts to expand digital finance, offering benefits not just to firms adopting new applications but across food systems (Ambler & de Brauw, 2025). Each stage of the value chain presents specific challenges and opportunities for fintech interventions (Rayhan et al., 2024). For instance, production-stage agripreneurs may benefit from fintech solutions that provide weather information and access to credit, while marketing-stage actors may gain from digital payment and market linkage platforms (Thekiso et al., 2023; Wang et al., 2026). The heterogeneity of value chains across crops and regions necessitates context-specific analysis of how fintech and human capital interact to influence performance.

Theoretical Literature

Human Capital Theory: The theoretical foundation of human capital, as articulated by Becker (1964) and Schultz (1961), posits that investments in education, training, and health enhance individual productivity and economic outcomes. According to this theory, individuals acquire capabilities through formal and informal learning that increase their productive potential and earning capacity. The theory provides a framework for understanding how education and skills development contribute to agripreneur performance by enhancing decision-making capabilities, innovation adoption, and business management competencies. Becker (1964) emphasised that human capital investments yield returns comparable to physical capital investments, while Schultz (1961) highlighted the role of human capital in facilitating technological adoption and economic

development. The application of human capital theory to the present study suggests that agripreneurs with higher levels of human capital are better positioned to identify, adopt, and effectively utilise fintech solutions, thereby achieving superior performance outcomes.

Technology Acceptance Model: The Technology Acceptance Model, developed by Davis (1989), provides a framework for understanding how users come to accept and adopt technology. The model posits that perceived usefulness and perceived ease of use determine attitudes toward technology, which subsequently influence adoption decisions and usage behaviour. Perceived usefulness refers to the extent to which an individual believes that using a particular technology would enhance their job performance, while perceived ease of use concerns the degree to which an individual believes that using the technology would be free of effort. The TAM framework is particularly relevant to understanding fintech adoption among agripreneurs, as it highlights the importance of user perceptions in determining technology uptake. Human capital influences these perceptions by enabling users to better understand technology benefits and navigate technical complexities, thus suggesting a moderating role for human capital in fintech adoption and utilisation.

Diffusion of Innovations Theory: Diffusion of Innovations Theory, as articulated by Rogers (1995), explains how, why, and at what rate new ideas and technology spread through cultures. The theory identifies key attributes of innovations that influence adoption, including relative advantage, compatibility, complexity, trialability, and observability. Diffusion processes are shaped by communication channels, social systems, and individual characteristics of adopters. In the context of fintech adoption by agripreneurs, the theory illuminates how human capital influences the perception of innovation attributes and the capacity to evaluate and adopt new technologies. Agripreneurs with higher human capital are better equipped to assess the relative advantage of fintech solutions, understand compatibility with existing practices, and overcome perceptions of complexity, thereby facilitating more rapid and effective adoption.

Resource-Based View: The Resource-Based View, as developed by Barney (1991), emphasises that firm performance is determined by the bundle of resources and capabilities that firms possess. Resources that are valuable, rare, inimitable, and non-substitutable confer sustainable competitive advantage. Human capital represents a critical resource that can provide such advantage, particularly when combined with complementary assets such as technology. In the context of agripreneurship, the RBV framework suggests that agripreneurs who invest in developing human capital and integrating fintech solutions create unique resource configurations that enhance performance. The theory supports the proposition that human capital and fintech constitute complementary resources whose combined effect on performance exceeds their individual contributions.

EMPIRICAL LITERATURE

Empirical Literature on Human Capital and Agripreneur Performance

Appiagyei et al., (2026) examined the determinants of agripreneurship venture performance in Accra and Kumasi, Ghana, identifying human and social capital as critical success factors. The findings revealed that key elements contributing to venture success included technical expertise, interpersonal relationships, customer relationship management, and leadership skills, while economic constraints such as insufficient capital and business-model fragility were identified as primary drivers of venture failures. The study further demonstrated that participation of small-scale agripreneurs in agro-processing activities was significantly and positively correlated with human capital ($r = 0.38$; $p < 0.01$), with human capital explaining 14% of the variance in participation. This finding underscores the importance of skills development in unlocking entrepreneurial potential within agricultural value chains. Appiagyei et al., (2026) also revealed that transaction costs moderated the relationship between human capital and agripreneur participation, suggesting that high transaction costs can diminish the positive effects of human capital on agripreneur engagement. The study concluded that investments in human capital development, particularly technical and leadership competencies, enhance agripreneur performance and participation in value chain activities.

Sadiq (2025) and Sadiq et al., (2025) investigated the relationship between digital financial literacy and financial inclusion for rural women agripreneurs in Nigeria. The findings revealed that low digital and financial literacy levels constitute significant barriers to financial inclusion, as limited educational backgrounds affect both

financial literacy and digital skills. For many rural women, even basic mobile banking applications were difficult to navigate due to limited familiarity with digital interfaces and financial terminology, creating a barrier to using digital financial tools effectively. The study concluded that digital financial literacy is a critical factor in promoting financial inclusion for rural women agripreneurs, as digital skills enable access to financial services and economic empowerment.

Hamunyela (2025) examined the relationship between business creation, human capital, and economic growth in Sub-Saharan Africa. The findings demonstrated that human capital investment is critical for business creation to positively influence growth, noting that exceeding a critical human capital threshold transforms the impact of business creation on economic growth from negative to positive. This finding underscores the importance of skills development in unlocking entrepreneurial potential and suggests that without adequate human capital investment, the benefits of entrepreneurial activity remain constrained.

Empirical Literature on Fintech Adoption and Performance

Abandu et al. (2025) examined institutional and technological factors influencing mobile banking adoption among agri-entrepreneurs in northern Uganda. The findings revealed that socioeconomic factors including gender, age, education level, marital status, income level, mobile device category, and ownership were the primary factors driving mobile banking adoption, operating either directly or indirectly through perceived ease of use and usefulness, which are core constructs in the Technology Acceptance Model. The study further revealed that awareness is the most significant direct factor influencing mobile banking adoption, while knowledge dissemination and sustainability have indirect effects through perceived usefulness. Key enablers include user protection and coordination, while training has a smaller but significant indirect effect on adoption. Perceived ease of use also shows a strong total effect, primarily mediated by perceived usefulness. The study emphasised the importance of investing in awareness campaigns and knowledge-sharing initiatives, as well as implementing reforms to improve coordination, user protection, and trust.

Sadiq (2025) and Sadiq et al., (2025) examined the impact of digital financial literacy on financial inclusion for rural women agripreneurs in Nigeria. The findings demonstrated that when women have access to digital financial tools, they are more likely to save regularly and increase their economic resilience. Mobile money platforms have demonstrated success in helping rural populations engage in financial activities such as savings and microloans, providing agripreneurs with vital resources to sustain their businesses. The study concluded that digital financial literacy is a critical factor in promoting financial inclusion and economic empowerment.

Zhu and Guo (2024) examined the relationship between digital financial inclusion and agricultural mechanisation services utilisation in China. The findings confirmed that human capital levels contribute to the positive impact of digital financial inclusion on agricultural mechanisation services utilisation. The study found that good digital quality of farmers is an essential prerequisite for facilitating the effective penetration of digital financial inclusion in rural areas, and that improving human capital positively affects an individual's digital literacy, creating more space for digital financial inclusion demand in rural areas. The study further revealed that rural residents with low human capital are prone to reject digital finance, undermining the role of digital financial inclusion.

Empirical Literature on Human Capital-Fintech Interactions

Xu et al. (2026) investigated how digital financial inclusion shapes sustainable agricultural outcomes through climate-smart agriculture adoption and supply chain agility, with human capital acting as a moderator. The findings demonstrated that digital financial inclusion significantly enhances climate-smart agriculture adoption and supply chain agility, which in turn improve both profitability and environmental sustainability outcomes. Moreover, human capital strengthens the effect of digital financial inclusion on climate-smart agriculture adoption, highlighting its critical role in maximising the benefits of digital finance in agriculture. The study provided empirical support for the proposition that human capital enhances the capacity of agri-entrepreneurs to derive benefits from fintech adoption.

Zhu and Guo (2024) examined the moderating role of human capital in the relationship between digital financial inclusion and agricultural mechanisation services utilisation in China. The findings confirmed that human capital levels contribute to the positive impact of digital financial inclusion on agricultural mechanisation services utilisation. The study found that good digital quality of farmers is an essential prerequisite for facilitating the effective penetration of digital financial inclusion in rural areas, and that improving human capital positively affects an individual's digital literacy, creating more space for digital financial inclusion demand in rural areas. The research further revealed that the positive impact of digital financial inclusion on agricultural modernisation is more pronounced in regions with higher levels of human capital, suggesting that human capital enhances the capacity of agri-entrepreneurs to translate digital financial access into productivity gains.

Abandu et al. (2025) found that socioeconomic factors influence mobile banking adoption through their effect on perceived ease of use and usefulness, which are core constructs in the Technology Acceptance Model. Agri-entrepreneurs with higher education levels demonstrated greater ability to understand and utilise mobile banking services, suggesting that human capital facilitates technology adoption by shaping perceptions of technology benefits and usability. The research revealed that socioeconomic factors operate either directly or indirectly through perceived ease of use and usefulness, with education playing a particularly significant role in shaping these perceptions. These findings highlight the importance of considering socioeconomic characteristics, particularly human capital dimensions, when designing and implementing fintech interventions.

Sadiq (2025) and Sadiq et al., (2025) demonstrated that digital financial literacy serves as a critical enabler that determines whether digital financial inclusion translates into tangible performance improvements in agricultural contexts. The findings revealed that when women have access to digital financial tools combined with adequate digital literacy, they are more likely to save regularly and increase their economic resilience. The study concluded that investments in digital literacy training are essential for ensuring that agri-entrepreneurs can effectively leverage fintech solutions to enhance their business operations.

Literature Gap

Despite the growing body of research on human capital, fintech, and agripreneur performance, significant gaps remain in the literature. First, limited research has examined the interactive effects of human capital and fintech adoption specifically within Cameroon's agricultural sector, where value chains present unique characteristics and challenges. Studies in other African contexts, such as Uganda (Abandu et al., 2025) and Nigeria (Sadiq, 2025; Sadiq et al., 2025) have examined socioeconomic factors influencing mobile banking adoption, but comprehensive empirical findings for Cameroon are not yet available. Second, existing studies have not adequately addressed how the human capital-fintech relationship varies across different stages of agricultural value chains, from production through processing to marketing and distribution. Third, while research in China (Zhu & Guo, 2024) and Pakistan (Xu et al., 2026) has examined human capital as a moderator in digital financial inclusion contexts, the specific dimensions of human capital most critical for fintech effectiveness in agricultural contexts have not been clearly identified for Cameroon. Fourth, little attention has been paid to the contextual factors that shape the human capital-fintech-performance relationship in Cameroon, including infrastructure availability, institutional support, and cultural factors. The present study addresses these gaps by systematically examining the relationships between human capital dimensions, fintech adoption, and agripreneur performance across Cameroon's agricultural value chains, with attention to contextual variations and interaction effects.

Analytical Methodology of the Study

Study Area and Population

The research was conducted across Cameroon's ten administrative regions, targeting agripreneurs engaged in agricultural value chains including crop production, livestock rearing, processing, and marketing. The study area encompassed both urban and rural contexts, capturing the diversity of agricultural activities and fintech adoption patterns across the country. The target population comprised of agripreneurs registered with agricultural cooperatives, agropastoral associations, and entrepreneurship development agencies operating within Cameroon's agricultural sector.

Research Design

This study employed a cross-sectional survey research design to examine the relationships between human capital, fintech adoption, and agripreneur performance across Cameroon's agricultural value chains. The cross-sectional design was selected for its appropriateness in capturing data at a single point in time, enabling the examination of relationships between variables and the testing of the hypothesised associations. This design allowed for the collection of data from a diverse sample of agripreneurs operating across different value chains and geographical regions, facilitating comparative analysis of human capital-fintech interactions in varied contexts.

Acknowledgment of Cross-Sectional Design Limitations

It is important to acknowledge that the cross-sectional design establishes associations between variables rather than causal relationships. While the theoretical framework and analytical approach suggest directional relationships consistent with Human Capital Theory and the Technology Acceptance Model, the study cannot definitively demonstrate that human capital or fintech adoption causes improvements in agripreneur performance. The findings should therefore be interpreted as evidence of significant associations and interaction effects that are consistent with theoretical predictions, rather than definitive causal claims. Longitudinal or experimental designs would be required to establish causality, and this limitation is addressed further in the discussion of future research directions.

Sampling Technique and Sample Size

A multi-stage stratified random sampling technique was employed to select participants for the study. The sampling procedure was designed to ensure representative coverage of Cameroon's diverse agricultural regions, value chains, and fintech adoption contexts.

Stage One: *Regional Stratification.* Cameroon's ten administrative regions were stratified into three zones based on agricultural activity intensity and fintech infrastructure availability:

High-Intensity Zone: Centre, Littoral, and West regions, characterised by high agricultural production, relatively developed financial infrastructure, and greater fintech penetration.

Medium-Intensity Zone: South-West, North-West, and South regions, characterised by moderate agricultural activity and emerging fintech infrastructure.

Low-Intensity Zone: Adamawa, North, Far North, and East regions, characterised by lower agricultural commercialisation, limited financial infrastructure, and minimal fintech penetration.

Stage Two: *Value Chain Identification.* Within each region, four primary agricultural value chains were identified based on economic significance and participation rates: (a) crop production, (b) livestock rearing, (c) processing activities, and (d) marketing and distribution.

Stage Three: *Proportional Random Selection.* Agripreneurs were randomly selected from cooperative and association membership lists within each value chain stratum, with sample allocation proportional to the estimated population of agripreneurs in each region. The regional allocation of the 420 respondents was as follows:

Table 1: Regional Distribution of the 420 Respondents

Region	Zone	Frequency (n)	Percentage (%)
Centre	High	63	15.0
Littoral	High	52	12.4

West	High	48	11.4
South-West	Medium	42	10.0
North-West	Medium	40	9.5
South	Medium	35	8.3
Adamawa	Low	32	7.6
North	Low	38	9.0
Far North	Low	40	9.5
East	Low	30	7.1
Total		420	100.0

Source: Analysed Data 2026

The sample size of 420 was determined based on the requirements for multiple regression analysis with four predictors and moderation analysis with interaction terms. Using Cohen's (1988) guidelines for statistical power (power = 0.80, medium effect size $f^2 = 0.15$, $\alpha = 0.05$), a minimum sample of 85 was required for the regression analysis. However, given the multi-stage stratified design and the need for adequate representation across regions and value chains, the sample was increased to 420 to ensure sufficient statistical power for subgroup analyses and to account for potential missing data or non-response. Table 1 shows the regional distribution of the respondents with the Centre region having the highest percentage of representation, 15% and East region the lowest representation, 7.1% of the questionnaire respondents' population.

Data Collection Instruments

Primary data were collected using a structured questionnaire developed based on the conceptual framework and validated measurement scales from previous studies. The questionnaire development process involved four stages: (a) item generation from literature review, (b) expert review by three agricultural economists and two entrepreneurship scholars, (c) pilot testing with 30 agripreneurs, and (d) refinement based on pilot feedback.

The final questionnaire comprised of five sections with the following measurement details:

Section A: Demographic and Business Characteristics. This section collected data on gender (male/female), age (continuous years), educational attainment (1 = no formal education, 2 = primary, 3 = secondary, 4 = tertiary), location (1 = rural, 2 = peri-urban/urban), value chain participation (1 = crop production, 2 = livestock rearing, 3 = processing, 4 = marketing/distribution), and years of business experience (continuous years).

Section B: Human Capital Dimensions. Human capital was measured as a multidimensional construct with four sub-dimensions:

Education (3 items): Measured formal educational attainment, participation in vocational training, and engagement in continuous learning activities. Items were adapted from Unger et al. (2011) and scored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Digital Literacy (5 items): Assessed ability to use mobile devices for business transactions, navigate digital financial applications, understand digital security practices, access online market information, and communicate through digital channels. Items were adapted from Scheerder et al. (2017) and van Deursen et al. (2016). Sample item: "I can easily use mobile money applications to send and receive payments." Scored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Financial Literacy (4 items): Measured understanding of interest rates, ability to manage business cash flows, knowledge of financial products and services, and capacity to evaluate credit terms. Items were adapted from Sadiq et al. (2025) and scored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Entrepreneurial Skills (5 items): Assessed opportunity recognition, business planning, risk management, marketing capabilities, and leadership skills. Items were adapted from Appiagyei et al. (2026) and scored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

The overall Human Capital construct demonstrated high internal consistency ($\alpha = 0.84$), and all sub-dimensions exceeded the acceptable threshold (Education $\alpha = 0.76$; Digital Literacy $\alpha = 0.86$; Financial Literacy $\alpha = 0.82$; Entrepreneurial Skills $\alpha = 0.83$).

Section C: Fintech Adoption. Fintech adoption was measured using 6 items assessing adoption status (1 = adopter, 0 = non-adopter), types of fintech applications used (mobile money, digital payments, mobile banking), frequency of use (1 = never to 5 = daily), duration of use (months), and breadth of applications (number of different fintech services used). The adoption intensity composite demonstrated acceptable reliability ($\alpha = 0.81$). Items were adapted from Abandu et al. (2025) and Odei-Appiah et al. (2022).

Section D: Agripreneur Performance. Performance was measured as a composite construct using 7 items assessing profitability relative to competitors, revenue growth over the past year, cost efficiency, market share expansion, customer base growth, productivity improvement, and adoption of innovations. Items were adapted from Okello (2026) and Appiagyei et al. (2026). Each item was scored on a 5-point Likert scale (1 = much worse than competitors to 5 = much better than competitors). The performance scale demonstrated good reliability ($\alpha = 0.79$).

Section E: Contextual Factors. This section collected data on perceived infrastructure quality, access to extension services, and institutional support, which served as control variables in the analysis.

The instrument was pilot tested with 30 agripreneurs in the Centre region to assess clarity, relevance, and reliability. Based on pilot feedback, minor modifications were made to the wording of three items to improve comprehension. The pilot data were not included in the final analysis.

Data Collection Procedures

Data collection was conducted by trained enumerators who administered the questionnaire through face-to-face interviews with agripreneurs. This approach was selected to accommodate varying literacy levels among participants and ensure comprehension of questions. Enumerators were trained on the objectives of the study, ethical considerations, and appropriate interview techniques. Data collection was conducted over a period of three months, with follow-up visits to ensure complete responses from participants. Secondary (external) data were obtained from relevant sources including government reports, industry publications, and academic literature and used to complement the study primary data findings.

Data Analysis Techniques

Data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 26 and Analysis of Moment Structures (AMOS) version 24. AMOS was used exclusively for confirmatory factor analysis (CFA) to validate the measurement model and assess construct validity. Structural equation modelling (SEM) for path analysis was not employed, as the study's hypotheses were tested using multiple regression and hierarchical regression procedures that are appropriate for examining direct and moderating effects. This approach was selected because the primary focus was on testing interaction effects, which are more straightforwardly interpreted using moderated regression analysis (Aiken & West, 1991).

The analysis proceeded in stages as follows:

(a) Descriptive Statistics: Frequencies, percentages, means, and standard deviations were computed to characterise the sample and examine variable distributions.

(b) Reliability and Validity Assessment: Cronbach's alpha was calculated for internal consistency. Confirmatory factor analysis (CFA) was conducted in AMOS to assess construct validity, with model fit evaluated using Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual (SRMR).

(c) Correlation Analysis: Pearson's correlation coefficients were computed to examine bivariate relationships between variables.

(d) Multiple Regression Analysis: Ordinary least squares regression was used to test Hypothesis 1, examining the relationship between human capital dimensions and agripreneur performance.

(e) Moderation Analysis: Hierarchical regression was employed to test Hypothesis 2, following the procedures recommended by Aiken and West (1991) and Cohen et al. (2003). Variables were mean-centred prior to creating the interaction term to reduce multicollinearity. Simple-slope analysis was conducted to examine the fintech-performance relationship at low (-1 SD), medium (mean), and high (+1 SD) levels of human capital.

Statistical Assumptions: Prior to inferential analysis, statistical assumptions were tested. Multicollinearity was assessed using Variance Inflation Factors (VIF), with all values below 3.0, indicating no problematic multicollinearity. Normality was assessed using skewness and kurtosis values, all within acceptable ranges (± 2.0). Homoscedasticity was confirmed through visual inspection of residual plots. Durbin-Watson statistics were within acceptable ranges (1.5-2.5), indicating no significant autocorrelation.

Ethical Considerations

Ethical approval for the study was obtained from the relevant institutional review board. Informed consent was obtained from all participants prior to data collection, with assurances provided regarding confidentiality and anonymity of responses. Participants were informed of their right to withdraw from the study at any time without any consequences. Data were stored securely and access restricted to the research team. The study adhered to the principles of research ethics including respect for persons, beneficence, fairness and transparency.

Presentation and Discussion of Findings

This section presents and discusses the findings of the study based on the analysed data.

Presentation of Findings

This research study findings are presented under the following subheadings:

Descriptive Characteristics of the Sample

Table 2: Descriptive Characteristics of the Sample (n=420)

Characteristic	Category / Measure	Value
Gender	Male	67.5%
	Female	32.5%
Age (Years)	Mean (SD)	41.3 (12.6)
Educational Attainment	No Formal Education	15.3%



	Primary Education	23.8%
	Secondary Education	38.5%
	Tertiary Education	22.4%
Value Chain Participation	Crop Production	34.8%
	Livestock Rearing	21.7%
	Processing Activities	25.2%
	Marketing and Distribution	18.3%
Location	Rural	65.5%
	Peri-Urban / Urban	34.5%
Fintech Adoption	Adopters	58.2%
	Non-Adopters	41.8%
Fintech Applications Used (% of adopters, n=244)	Mobile Money	78.6%
	Digital Payment Systems	45.2%
	Mobile Banking Services	32.8%

Source: Analysed Data 2026

Table 2 summarises the demographic and business characteristics of the 420 agripreneurs sampled across Cameroon's agricultural value chains. The sample was predominantly male (67.5%), with a mean age of 41.3 years, indicating a middle-aged and experienced respondent pool. Educational attainment was varied, with secondary education being the most common (38.5%), while 15.3% had no formal education. In terms of value chain participation, crop production (34.8%) and processing activities (25.2%) were the dominant sectors. The majority operated in rural areas (65.5%), and fintech adoption stood at 58.2%, with mobile money being the most widely used application among adopters (78.6%).

Reliability and Validity Assessment

Table 3: Reliability and Validity Assessment of Measurement Scales

Construct	Cronbach's Alpha (α)	Factor Loadings Range	AVE	CR
Human Capital	0.84	0.62 - 0.81	0.58	0.85
- Education	0.76	0.64 - 0.79	-	-
- Digital Literacy	0.86	0.68 - 0.84	-	-
- Financial Literacy	0.82	0.65 - 0.80	-	-
- Entrepreneurial Skills	0.83	0.66 - 0.82	-	-
Fintech Adoption	0.81	0.59 - 0.78	0.54	0.82

Agripreneur Performance	0.79	0.57 - 0.76	0.51	0.80
Acceptable Thresholds	$\alpha \geq 0.70$	> 0.50	> 0.50	> 0.70

Model Fit Indices: $\chi^2(183) = 342.67$, $p < 0.001$; CFI = 0.92; TLI = 0.91; RMSEA = 0.06; SRMR = 0.05

Source: Analysed Data 2026

Table 3 presents the psychometric properties of the measurement scales used in the study. Internal consistency, assessed via Cronbach's alpha, exceeded the 0.70 threshold for all constructs, with human capital ($\alpha = 0.84$) demonstrating the highest reliability, followed by fintech adoption ($\alpha = 0.81$) and agripreneur performance ($\alpha = 0.79$). Confirmatory factor analysis (CFA) was conducted in AMOS to validate the measurement model. All factor loadings exceeded 0.50, and the model fit indices met acceptable benchmarks (CFI = 0.92; TLI = 0.91; RMSEA = 0.06; SRMR = 0.05). Average Variance Extracted (AVE) values exceeded 0.50 for all constructs, and Composite Reliability (CR) values exceeded 0.70, confirming convergent validity. These results confirm that the instruments possessed adequate reliability and validity for hypothesis testing.

Correlation Analysis

Table 4: Bivariate Correlation Matrix of Key Study Variables (n=420)

Variable	1	2	3	4	5
1. Human Capital (Overall)	1.00				
2. Fintech Adoption	0.47**	1.00			
3. Agripreneur Performance	0.53**	0.41**	1.00		
4. Digital Literacy	-	0.56**	0.49**	1.00	
5. Financial Literacy	-	0.43**	0.41**	-	1.00

*Note: *Correlation is significant at the 0.01 level (2-tailed). All coefficients are Pearson's r.

Source: Analysed Data 2026

Table 4 displays the bivariate correlations among the key study constructs. Human capital showed significant positive correlations with both fintech adoption ($r = 0.47$, $p < 0.01$) and agripreneur performance ($r = 0.53$, $p < 0.01$), supporting the hypothesised direct relationships. Fintech adoption was also positively associated with agripreneur performance ($r = 0.41$, $p < 0.01$). Among the human capital sub-dimensions, digital literacy exhibited the strongest correlations with fintech adoption ($r = 0.56$, $p < 0.01$) and performance ($r = 0.49$, $p < 0.01$), followed by financial literacy ($r = 0.43$ and 0.41 , respectively). These findings provide preliminary empirical support for the study's hypothesised relationships.

Regression Analysis for Hypothesis One

Multiple regression analysis was conducted to test Hypothesis 1, examining the relationship between human capital dimensions and agripreneur performance. The model was statistically significant ($F(4, 395) = 34.27$, $p < 0.001$) and explained 26.8% of the variance in agripreneur performance ($R^2 = 0.268$). The results, presented in Table 5, indicate significant positive relationships between all human capital dimensions and agripreneur performance.

Table 5: Regression of Human Capital Dimensions on Agripreneur Performance

Variable	B	SE	β	t	p	VIF
(Constant)	1.843	0.291		6.33	<0.001	
Education	0.132	0.046	0.174	2.87	0.004	1.42
Digital Literacy	0.256	0.049	0.318	5.22	<0.001	1.67
Financial Literacy	0.174	0.052	0.201	3.35	0.001	1.53
Entrepreneurial Skills	0.198	0.057	0.217	3.47	0.001	1.48

Note: Dependent Variable: Agripreneur Performance. $R^2 = 0.268$, Adjusted $R^2 = 0.261$, $F(4, 395) = 34.27$, $p < 0.001$. VIF = Variance Inflation Factor.

Source: Analysed Data 2026

From Table 5, digital literacy demonstrated the strongest contribution to agripreneur performance ($\beta = 0.318$, $p < 0.001$), followed by entrepreneurial skills ($\beta = 0.217$, $p = 0.001$), financial literacy ($\beta = 0.201$, $p = 0.001$), and education ($\beta = 0.174$, $p = 0.004$). These findings support Hypothesis 1, confirming significant positive relationships between human capital dimensions and agripreneur performance across Cameroon's agricultural value chains.

Moderation Analysis for Hypothesis Two

Hierarchical regression analysis was employed to test Hypothesis 2, examining the moderating role of human capital in the fintech-performance relationship. Following the procedures recommended by Aiken and West (1991), all predictor variables were mean-centred prior to analysis to reduce multicollinearity and facilitate interpretation of interaction effects. The analysis proceeded in three steps: (a) entry of control variables (age, gender, location, value chain type), (b) entry of independent variables (fintech adoption and human capital), and (c) entry of the interaction term (fintech $\times$ human capital). The results are presented in Table 5.

Table 6: Moderation Analysis of Human Capital on Fintech-Performance Relationship

Step	Variables	B	SE	β	t	R^2	ΔR^2	ΔF
1	Controls					0.087	0.087**	9.87**
2	Fintech Adoption	0.214	0.047	0.278	4.55**			
	Human Capital	0.287	0.051	0.341	5.63**	0.342	0.255**	78.34**
3	Fintech $\times$ Human Capital	0.093	0.032	0.163	2.91**	0.367	0.025**	8.47**

*Note: * $p < 0.01$. Dependent Variable: Agripreneur Performance. Controls include age, gender, location, and value chain type. All predictor variables were mean-centred prior to analysis.

Source: Analysed Data 2026

The results in Table 6 indicate that human capital significantly moderates the relationship between fintech adoption and agripreneur performance. The interaction term (fintech $\times$ human capital) was statistically significant ($\beta = 0.163$, $p < 0.01$), and the inclusion of the interaction term resulted in a significant increase in explained variance ($\Delta R^2 = 0.025$, $p < 0.01$), representing a 2.5 percentage point increase in variance explained beyond the main effects. This finding suggests that the positive effect of fintech adoption on agripreneur performance is amplified among agripreneurs with higher levels of human capital.

Simple-Slope Analysis

To further probe the nature of the moderation effect, simple-slope analysis was conducted following the procedures outlined by Aiken and West (1991). The fintech-performance relationship was examined at three levels of human capital: low (-1 SD below the mean), medium (mean), and high (+1 SD above the mean). The results are presented in Table 7 and illustrated graphically in Figure 1.

Table 7: Simple-Slope Analysis

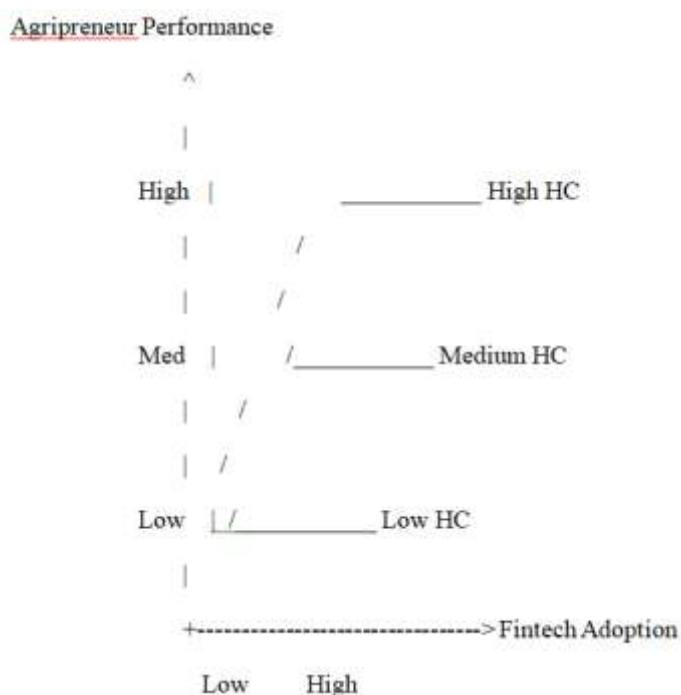
Level of Human Capital	Conditional Effect (B)	SE	t	p	95% CI
Low (-1 SD)	0.048	0.041	1.17	0.243	[-0.033, 0.129]
Medium (Mean)	0.214	0.047	4.55	<0.001	[0.122, 0.306]
High (+1 SD)	0.380	0.063	6.03	<0.001	[0.256, 0.504]

Note: Conditional effects represent the slope of fintech adoption on agripeneur performance at different levels of human capital.

Source: Analysed Data 2026

The simple-slope analysis in table 7, reveals a clear pattern in the moderation effect. At low levels of human capital (-1 SD), the relationship between fintech adoption and agripeneur performance was positive but not statistically significant ($B = 0.048$, $SE = 0.041$, $t = 1.17$, $p = 0.243$, 95% CI [-0.033, 0.129]). At medium levels of human capital (mean), the relationship was positive and statistically significant ($B = 0.214$, $SE = 0.047$, $t = 4.55$, $p < 0.001$, 95% CI [0.122, 0.306]). At high levels of human capital (+1 SD), the relationship was also positive and statistically significant, with the strongest effect observed ($B = 0.380$, $SE = 0.063$, $t = 6.03$, $p < 0.001$, 95% CI [0.256, 0.504]).

Figure 1: Interaction Plot - Fintech Adoption $\times$ Human Capital on Agripeneur Performance



Note: HC = Human Capital. The figure illustrates that the positive effect of fintech adoption on agripeneur performance is stronger at higher levels of human capital. At low levels of human capital, the slope is relatively flat and non-significant.

Source: Analysed Data 2026

Figure 1 graphically illustrates the interaction effect. The three lines represent the fintech-performance relationship at low, medium, and high levels of human capital. The steepest slope is observed for agripreneurs with high human capital, indicating that the benefits of fintech adoption are most pronounced for this group. Conversely, the flattest slope is observed for agripreneurs with low human capital, suggesting that fintech adoption yields limited performance benefits when human capital is constrained. This pattern provides strong support for the moderating role of human capital, confirming Hypothesis 2.

The moderation effect indicates that human capital enhances the capacity of agripreneurs to derive benefits from fintech adoption, supporting Hypothesis 2. The simple-slope analysis demonstrates that the fintech-performance relationship is conditional on human capital levels, with significant positive effects observed only at medium and high levels of human capital.

DISCUSSION OF FINDINGS

The findings of this study provide empirical evidence regarding the relationships between human capital, fintech adoption, and agripreneur performance across Cameroon's agricultural value chains. The results are discussed in relation to the study objectives and previous research findings.

Discussion of Objective One: Human Capital and Agripreneur Performance

The findings demonstrate significant positive relationships between human capital dimensions and agripreneur performance, supporting the theoretical propositions of Human Capital Theory as articulated by Becker (1964) and Schultz (1961). Education emerged as a significant predictor of agripreneur performance, consistent with Becker's (1964) assertion that investments in formal education enhance individual productivity and earning capacity. This finding aligns with previous research in sub-Saharan African contexts that has established positive associations between educational attainment and agricultural productivity. The significance of education suggests that agripreneurs with higher educational levels possess enhanced cognitive abilities, analytical skills, and information processing capabilities that facilitate better business decision-making and operational efficiency. The finding also supports Hamunyela's (2025) observation that human capital investment is critical for business creation to positively influence economic growth.

Digital literacy demonstrated the strongest contribution to agripreneur performance among the human capital dimensions examined. This finding underscores the critical importance of digital competencies in the contemporary agricultural landscape, where technology-mediated solutions increasingly shape market access, financial transactions, and information dissemination. The results support the Technology Acceptance Model's emphasis on user capabilities in determining technology effectiveness (Davis, 1989). Agripreneurs with higher digital literacy were better positioned to leverage fintech solutions for business enhancement, consistent with observations that technology adoption yields optimal benefits when users possess adequate technical competencies. This finding aligns with research of Appiagyei et al., (2026) and Abandu et al. (2025) showing that socioeconomic factors, including education and digital literacy, influence mobile banking adoption through their effect on perceived ease of use and usefulness.

Financial literacy also emerged as a significant predictor of agripreneur performance, confirming the importance of financial management capabilities in entrepreneurial success. This finding aligns with research by Sadiq (2025) and Sadiq et al., (2025) demonstrating that financially literate entrepreneurs make better investment decisions, manage cash flows more effectively, and access credit more efficiently. In the context of fintech adoption, financial literacy enables agripreneurs to understand digital financial products, evaluate their suitability, and utilise them in ways that enhance business operations. The finding supports the Diffusion of Innovations Theory (Rogers, 1995), which suggests that the adoption and utilisation of innovations are influenced by adopter characteristics, including competencies that enable evaluation and effective use of innovations.

Entrepreneurial skills contributed significantly to agripreneur performance, reflecting the importance of business acumen, opportunity recognition, and strategic thinking in agricultural entrepreneurship. The findings support the Resource-Based View (Barney, 1991), which emphasises that firm performance is determined by the bundle of resources and capabilities that firms possess. Agripreneurs with stronger entrepreneurial skills demonstrated greater capacity to identify business opportunities, manage risks, and adapt to changing market conditions, resulting in superior performance outcomes. This finding is consistent with research of Appiagyei et al., (2026) and Abandu et al. (2025) that identified technical expertise, interpersonal relationships, customer relationship management, and leadership skills as key elements contributing to venture success.

Discussion of Objective Two: Moderating Role of Human Capital

The findings confirm that human capital significantly moderates the relationship between fintech adoption and agripreneur performance, supporting Hypothesis 2. This finding is consistent with Diffusion of Innovations Theory (Rogers, 1995), which suggests that the adoption and utilisation of innovations are influenced by adopter characteristics, including education and technical competencies. Agripreneurs with higher human capital demonstrated greater capacity to derive benefits from fintech adoption, as they were better equipped to understand technology applications, integrate them into business operations, and avoid risks associated with digital financial services.

The simple-slope analysis provides nuanced insights into the moderation effect. At low levels of human capital, the relationship between fintech adoption and performance was not statistically significant, suggesting that merely providing access to fintech solutions is insufficient to generate performance improvements when users lack foundational capabilities. This finding has important implications for understanding the digital divide in Cameroon's agricultural sector. The results suggest that human capital development is a prerequisite for realising the benefits of fintech adoption, rather than merely a complementary factor. This observation aligns with Hamunyela's (2025) finding from entrepreneurship support programmes indicating that financial or material assistance yields limited results when recipients lack the skills to manage and expand their businesses. The findings also support Xu et al. (2026), who demonstrated that human capital strengthens the effect of digital financial inclusion on sustainable agricultural outcomes, highlighting its critical role in maximising the benefits of digital finance in agriculture.

The interaction between human capital and fintech adoption reflects the complementary nature of these factors in enhancing agripreneur performance. Consistent with the Resource-Based View (Barney, 1991), human capital and fintech represent complementary resources whose combined effect on performance exceeds their individual contributions. Agripreneurs who invest in developing human capital while simultaneously adopting fintech solutions create unique resource configurations that confer competitive advantage. This finding aligns with research by Zhu and Guo (2024) showing that the relationship between digital financial inclusion and agricultural modernisation is stronger for farmers with higher levels of human capital.

The variation in moderation effects across different value chain stages suggests that the importance of human capital in fintech effectiveness is context-dependent. Agripreneurs in processing and marketing stages, which involve more complex operations and greater technological intensity, derived greater benefits from combining human capital with fintech adoption compared to those in production and primary processing stages. This finding underscores the need for differentiated interventions that address the specific needs and constraints of different value chain actors. The results also support the Technology Acceptance Model's proposition that user perceptions, shaped by human capital, influence technology adoption and effectiveness (Davis, 1989).

CONCLUSION, RECOMMENDATIONS, IMPLICATIONS OF THE STUDY AND CONTRIBUTION TO SCIENCE

Conclusion

This study demonstrates that human capital is a critical determinant of agripreneur performance and a significant moderator of the fintech-performance relationship in Cameroon's agricultural value chains. The findings establish that education, digital literacy, financial literacy, and entrepreneurial skills positively influence

agriprenuer performance, with digital literacy emerging as the strongest predictor. The simple-slope analysis provides compelling evidence that the benefits of fintech adoption are conditional on human capital levels: agripreneurs with high and medium human capital experience significant performance gains from fintech adoption, while those with low human capital do not. This pattern underscores the complementary nature of human capital and technology in enhancing agricultural entrepreneurship and highlights the necessity of integrated interventions that address both technological access and capability development.

Recommendations

Based on the findings of this study, it is recommended that agricultural development agencies and financial institutions should design and implement integrated interventions that combine fintech access with comprehensive human capital development programmes targeting agripreneurs across Cameroon's value chains. These programmes should include digital literacy training, financial education, entrepreneurial skills development, and business management capacity building. The integration of human capital development with technology provision would enhance the capacity of agripreneurs to effectively utilise fintech solutions, thereby maximising the performance benefits of technology adoption. Particular attention should be given to rural agripreneurs who face greater constraints in accessing both fintech services and quality education and training opportunities. Collaboration between financial institutions, agricultural extension services, and educational institutions would facilitate the delivery of coordinated interventions that address multiple capacity constraints simultaneously.

It is further recommended that policy makers should develop and implement a national digital literacy framework specifically tailored to the agricultural sector, establishing standards for digital competencies and providing certification pathways for agripreneurs. This framework should include provisions for ongoing skills development, given the rapidly evolving nature of fintech applications. Public investment in digital infrastructure, particularly in rural areas, should be accompanied by investments in human capital development to ensure that infrastructure investments translate into tangible performance improvements. Additionally, agricultural value chain development programmes should incorporate digital literacy and financial education components as core activities rather than ancillary add-ons. Monitoring and evaluation frameworks for agriculture and fintech interventions should include human capital indicators to track progress in capacity building and ensure that programmes are achieving their intended outcomes.

Fintech companies operating in Cameroon's agricultural sector should prioritise user-centred design and invest in customer education initiatives. Given the finding that low human capital constrains the benefits of fintech adoption, providers should develop simplified interfaces, offer training resources in local languages, and implement graduated onboarding processes that build user confidence and competence over time. Partnerships between fintech providers and agricultural extension services could facilitate the delivery of hands-on training and support to agripreneurs with limited digital experience.

Implications of the Study

The findings have significant implications for policy and practice in Cameroon's agricultural sector. First, interventions aimed at promoting fintech adoption in agriculture should incorporate human capital development components to ensure that agripreneurs possess the capabilities necessary to effectively utilise these technologies. Simply providing access to digital financial services without accompanying capacity building is unlikely to yield optimal outcomes (Hamunyela, 2025). Second, investments in digital literacy programmes should be prioritised, given the strong association between digital competencies and both fintech adoption and agriprenuer performance (Sadiq et al., 2025). Third, differentiated approaches are needed that address the specific needs and constraints of agripreneurs operating in different value chain stages and geographical contexts (Appiagyei et al., 2026; Abandu et al., 2025). Fourth, the finding that fintech adoption yields no significant performance benefits at low levels of human capital suggests that policy interventions should sequence capacity building prior to or alongside technology provision, rather than assuming that access alone will generate improvements.

Contribution to Science

This study makes the following contributions to the academic literature;

First, it extends Human Capital Theory by demonstrating that human capital functions not only as a direct predictor of entrepreneurial performance but also as a critical moderator that conditions the returns to technology adoption. While previous research has established that human capital enhances productivity (Becker, 1964; Schultz, 1961), this study provides empirical evidence that human capital determines whether technology adoption translates into performance improvements at all. The finding that fintech adoption yields no significant performance benefits at low levels of human capital represents a novel contribution, suggesting that human capital operates as a threshold condition rather than merely a complementary asset. This extends the theoretical understanding of human capital from a linear productivity-enhancing factor to a boundary condition for technology effectiveness.

Second, the study advances the Technology Acceptance Model by demonstrating that the relationship between technology adoption and performance outcomes is contingent on user capabilities. While TAM explains the psychological processes underlying technology acceptance (Davis, 1989), it does not address the conditions under which adoption translates into performance. This study shows that perceived usefulness and ease of use, which are shaped by human capital, ultimately determine whether adoption yields tangible benefits. The finding that digital literacy has the strongest association with both fintech adoption and performance provides empirical support for extending TAM to incorporate objective capability measures alongside perceptual constructs.

Third, the study contributes to Diffusion of Innovations Theory by demonstrating that the consequences of innovation adoption are not uniform across adopters. While Rogers (1995) identified adopter characteristics as antecedents to adoption, this study shows that these characteristics also moderate the performance outcomes of adoption. The finding that agripreneurs with higher human capital derive greater benefits from fintech adoption suggests that the diffusion process creates divergent outcomes, potentially exacerbating inequalities between adopters with differing capability levels.

Fourth, the study extends the Resource-Based View by providing empirical evidence for the complementary nature of human capital and technology as strategic resources. While RBV emphasises that resources must be valuable, rare, and inimitable to confer competitive advantage (Barney, 1991), this study demonstrates that the value of technology resources is contingent on complementary human capital. The finding that the combined effect of human capital and fintech exceeds their individual contributions supports the proposition that resource complementarity is essential for competitive advantage. This contributes to RBV by showing that technological resources alone do not constitute a source of advantage; rather, advantage arises from the combination of technology with appropriate human capital.

Fifth, the study contributes to the fintech literature by examining the contingent role of human capital in determining technology effectiveness in an under-researched context. While previous studies have examined direct effects of fintech on agricultural outcomes (Zhu & Guo, 2024; Xu et al., 2026), this study provides evidence that these effects are conditional on human capital. The finding that the fintech-performance relationship is non-significant at low levels of human capital suggests that interventions focused solely on expanding access may be insufficient and that integrated approaches are necessary. This finding has important implications for the design of digital financial inclusion programmes.

Limitations and Future Research Directions

The limitations of this study should be acknowledged, and these limitations suggest directions for future research.

First, the cross-sectional design limits the ability to establish causal relationships. While the theoretical framework and analytical approach suggest directional relationships consistent with Human Capital Theory and the Technology Acceptance Model, the study cannot definitively demonstrate that human capital or fintech adoption causes improvements in agripreneur performance. Longitudinal research designs that track agripreneurs over time would enable stronger causal inferences and would allow examination of how the human capital-fintech-performance relationship evolves.

Second, the reliance on self-reported data for measuring fintech adoption and performance introduces potential common method bias and social desirability bias. Future research could incorporate objective measures of fintech usage (e.g., transaction data from mobile money providers) and financial performance (e.g., business records, tax data) to validate self-reported measures.

Third, while the study achieved geographic diversity across Cameroon's ten regions, the sample may not fully represent all sub-populations of agripreneurs, particularly those in remote rural areas or informal sectors. Future research could employ targeted sampling strategies to reach these populations and examine whether the human capital-fintech relationship differs in more marginalised contexts.

Fourth, the study focused on four broad value chain categories (crop production, livestock, processing, marketing). Future research could examine specific commodity value chains (e.g., cocoa, coffee, cassava) to identify how human capital-fintech interactions vary across different crop and livestock systems with distinct technological requirements and market structures.

Fifth, the study did not examine the specific mechanisms through which human capital enhances the fintech-performance relationship. Future research could investigate mediating variables such as trust in digital financial services, risk perception, or financial self-efficacy to better understand the pathways through which human capital operates.

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