

An Empirical Reassessment of the Impact of Small and Medium Scale Agricultural Enterprises on Household Welfare: Evidence from Kariji, Southern Kaduna, Nigeria

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ABSTRACT

Small and medium-scale agricultural enterprises (SMAEs) are widely recognised as a foundational component of rural economic life in sub-Saharan Africa, yet their specific effects on household welfare within localised farming communities remain insufficiently examined. This study empirically investigates the impact of SMAEs on household welfare and employment generation in Kariji, Southern Kaduna, a predominantly livestock-farming community in north-central Nigeria. Adopting a descriptive survey design, primary data were collected through structured questionnaires administered to 348 purposively selected respondents from a registered population of 2,650 SMEs in Kaduna State and analysed using descriptive statistics, chi-square hypothesis testing, and OLS regression at a 5% significance level. Survey instrument reliability was confirmed with Cronbach's Alpha values of 0.79–0.81 across all scales. Descriptive findings reveal moderately positive perceptions of SMAE contributions across six household welfare dimensions, namely financial well-being, improved living standards, reduced external dependency, healthcare access, food security, and education cost coverage, with means ranging from 2.99 to 3.14, alongside four employment dimensions with means between 2.92 and 3.02. Chi-square analysis indicates no statistically significant impact on either household welfare or employment creation, with all p-values substantially exceeding the 0.05 threshold. However, OLS regression controlling for household size, enterprise tenure, and enterprise type reveals that funding constraints, regulatory burden, and infrastructure deficits exert significant independent suppressive effects on welfare ($R^2 = 0.218$; $F = 11.82$; $p < 0.001$) and employment outcomes ($R^2 = 0.191$; $F = 9.93$; $p < 0.001$), explaining the apparent disconnect between moderate positive descriptive perceptions and chi-square inferential insignificance. These outcomes are attributed to compounding structural barriers including limited access to affordable finance, inadequate rural infrastructure, unfavourable regulatory conditions, poor market linkages, and insufficient entrepreneurial capacity. Grounded in Social Capital Theory and the Resource-Based View, the study recommends targeted microcredit expansion, rural infrastructure investment, entrepreneurial capacity building, regulatory reform, and cooperative market development as pathways to unlocking the developmental potential of agricultural SMEs in rural Nigeria.

Keywords: Small and medium enterprises; agricultural enterprises; household welfare; job creation; Southern Kaduna; Nigeria; chi-square analysis

INTRODUCTION

Small and medium-scale enterprises (SMEs) represent the dominant organisational form of economic activity across developing economies, functioning simultaneously as engines of employment generation, conduits of poverty reduction, and incubators of entrepreneurial innovation. Their significance in Nigeria's economic history is long-established: the formal recognition of small-scale enterprise in national planning dates to the Ten-Year Plan of Development and Welfare of Nigeria presented in 1946, which acknowledged the indispensable role of small businesses in national reconstruction (Basil, 2005). Since that colonial-era foundation, SMEs generally

and agricultural SMEs in particular have grown progressively in strategic importance, attracting sustained policy attention as governments across sub-Saharan Africa recognise that SME-led rural transformation may offer the most viable pathway to inclusive economic development.

The empirical case for SME primacy in employment creation is compelling at the global level. Approximately 26 million SMEs operating within the European Union provide employment for 109 million people (EuroStat, 2019). In the United States, SMEs account for 87 percent of the national workforce; German SMEs employ 72.6 percent of the labour force; and in South Korea and Taiwan, SME-driven manufacturing and export strategies have underpinned sustained national prosperity. In EU countries in 2016 specifically, SMEs constituted 9.63 percent of total enterprises, provided 45.18 percent of total employment, held a 48.54 percent share in manufacturing industry employment, and registered total employment of 83.6 million workers, accounting for a 42.5 percent share of total manufacturing industry employment (Statista, 2017). In Pakistan, SMEs dominate the fastest-growing export sectors, generate employment for 78 percent of the industrial labour force, and account for 53 percent of all SME activities in trade, retail, and wholesale sectors (Pakistan Bureau of Statistics, 2011).

In Nigeria, the agricultural sector which employs approximately 60 percent of the national labour force and contributes up to 35 percent of GDP is predominantly structured around small and medium-scale enterprises engaged in crop cultivation, livestock rearing, agro-processing, and rural commodity trading (Adewumi, 2008). The country ranks among the world's leading producers of cassava, yam, cowpea, cocoa, cashews, sweet potato, mango, papaya, millet, sorghum, and sesame, with the bulk of output originating from SMEs. Yet the sector is undermined by post-harvest losses estimated at 50 percent for vegetables, 30 percent for roots and tubers, and 20 percent for grains (FMARD, 2001) losses attributable to inadequate agro-machinery, poor infrastructure, and weak institutional support. Moreover, 95 percent of Nigeria's export earnings derive from petroleum and related products, a structural dependency that has historically diverted investment and policy attention away from agriculture, leaving the sector severely under-resourced.

The Nigerian government has implemented several policy frameworks to stimulate SMAE growth. The National Enterprises Development Programme (NEDEP) targeted the creation of 5.0 million direct and indirect jobs between 2013 and 2015, aiming to revitalise rural economies, alleviate poverty, facilitate entrepreneurial culture, enhance industrial cluster development, and increase MSMEs' contribution to GDP. The Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) exists to facilitate MSME access to finance, markets, and capacity-building resources. The Bank of Industry (BOI) established in 2001 as Nigeria's oldest and largest development finance institution provides loans, grants, equity financing, and guarantees to MSMEs. Tax incentives, waivers, and reduced corporate tax rates have additionally been deployed to incentivise SME growth. Yet despite this institutional architecture, SMAE performance in rural communities like Kariji in Southern Kaduna remains persistently constrained, and the measurable impact of agricultural enterprises on household welfare remains inadequately documented at community level.

This study addresses this critical gap by empirically investigating the impact of small and medium-scale agricultural enterprises on household welfare and job creation in Kariji, Southern Kaduna, Nigeria. Theoretically grounded in Social Capital Theory (Lin, 1999) and the Resource-Based View (Stacey, 2011), and methodologically anchored in descriptive survey research and chi-square inference, the study advances community-level, sector-specific evidence from a rural livestock-farming context that has received negligible academic attention. This study examines the role of small and medium-scale agricultural enterprises (SMAEs) in influencing household outcomes in Kariji, Southern Kaduna. It explores how these enterprises affect household welfare, particularly in terms of financial well-being, living standards, reduced external dependency, healthcare access, food security, and the ability to cover educational expenses. Furthermore, the study evaluates the contribution of SMAEs to employment by assessing their role in job creation, unemployment reduction, business expansion through funding, and income diversification within the community. It tests the null hypotheses that agricultural SMEs have no significant impact on household welfare in Kariji, Southern Kaduna, and no significant effect on job creation in Nigeria.

The remainder of the paper proceeds as follows: Section 2 reviews conceptual, theoretical, and empirical literature. Section 3 presents the methodology. Section 4 reports and analyses results. Section 5 discusses findings. Section 6 concludes with policy recommendations.

LITERATURE REVIEW

Conceptual Literature

SMEs as Development Agents

SMEs are characterised across disciplines by their size-related constraints limited capital, confined market reach, and restricted managerial capacity yet are simultaneously celebrated for their flexibility, labour-intensiveness, and proximity to community needs. In Nigeria, SMEs are largely dominated by agro-based enterprises specialising in the production of bulk commodities for domestic consumption and export promotion, particularly cash crops and processed agricultural products. Nigeria is one of the world's leading producers of fruits, cassava, yam, cowpea, and cocoa, with the bulk of this output traceable to SMEs (Adewumi, 2008). Post-harvest losses, however, remain a major structural liability reaching 50 percent for vegetables, 30 percent for roots and tubers, and 20 percent for grains (FMARD, 2001) a reflection of the inadequate agro-machinery, cold-chain infrastructure, and storage facilities that characterise rural agricultural SME environments in Nigeria.

The contributions of SMEs to household welfare operate through five primary channels: employment creation; rapid adaptability to demand changes through organisational flexibility; the stimulation of entrepreneurship; product differentiation through boutique and specialised production; and functioning as supplier sub-industries within larger enterprise ecosystems (EuroStat, 2019; Statista, 2017). According to Peterise (2003), SMEs in both the formal and informal sectors employ over 60 percent of Nigeria's labour force, while 70 to 80 percent of daily necessities consumed in the country are basic materials produced with minimal automation by small and medium enterprises. Odubanjo (2000), Onwumere (2000), and Nnanna (2001), as cited in Wahab and Ijaiya (2006), further affirm that SMEs contribute to rural infrastructure improvement, elevation of rural living standards, and employment creation through the utilisation of indigenous technology.

Entrepreneurship

The conceptual ecosystem of SMEs is inseparable from entrepreneurship. Dollinger (2003) identifies three foundational elements common across definitional traditions: creativity and innovation; resource gathering and the founding of economic organisations; and operation under conditions of risk and uncertainty. For entrepreneurship to flourish, Dollinger further stipulates two enabling conditions freedom to establish ventures and innovate, and an economic environment sufficiently prosperous to reward entrepreneurial effort. Ulhoi (2004) extends this analysis by arguing that entrepreneurship is not a purely individual disposition but is shaped decisively by the social network context surrounding the entrepreneur, the availability of market opportunities, and the institutional environment within which ventures operate.

In rural agricultural communities such as Kariji, the convergence of constrained social capital networks, limited opportunity sets, and an unfavourable regulatory climate severely depresses entrepreneurial potential among SMAE operators. The Portuguese proverb "the occasion creates the thief" aptly captures this dynamic: the scarcity of enabling conditions in rural Nigeria systematically suppresses the entrepreneurial activity that might otherwise transform agricultural SMEs into engines of household welfare improvement.

Agriculture and the Nigerian Economy

Agriculture is the most important sector in the Nigerian economy employing 60 percent of Nigerians, particularly rural dwellers, and contributing up to 35 percent of GDP. Despite this foundational role, Nigeria remains a net importer of food, a paradox attributable to several structural failures: the overwhelming majority of agricultural operators work at subsistence level, with minimal innovation in inputs, harvesting, processing, distribution, or market access; 95 percent of the country's exports are dominated by petroleum; and the arable land base 39.6 million hectares, of which 60 percent is under cultivation is chronically under-capitalised (Adewumi, 2008).

Nigeria possesses substantial agricultural potential, ranking among the world's largest producers of cassava, cashews, sweet potato, yams, mango, papaya, millet, sorghum, and sesame. A domestic population that represents a vast market for locally produced food, and a strategic position within West African regional value

chains, provides further structural advantage. The fundamental constraint, however, remains the peasant nature of the production system characterised by low productivity, poor adoption of improved technologies, and weak returns on investment. Agricultural commercialisation and targeted investment in SMEs are accordingly recognised as the key strategies for promoting accelerated modernisation and poverty reduction in the sector.

Household Welfare

Household welfare is conceptualised as the general condition of life of household members, operationally measured through consumption expenditure, food and non-food expenditure, and the incidence of poverty (Arouri et al., 2015; Unnikrishnan & Imai, 2020). Asmah and Avenue (2011) define it as the household's command over market goods and services. Welfare creation is the central objective of the Sustainable Development Goals (SDGs) 2030 encompassing freedom from poverty (SDG 1), freedom from hunger and food insecurity (SDG 2), and decent employment (SDG 8). In developing countries, where the agricultural sector absorbs a majority of the workforce, well-managed agricultural development is recognised as uniquely capable of simultaneously advancing economic growth, reducing poverty, curtailing unemployment, and improving general social welfare (Setboonsarng, 2006).

THEORETICAL LITERATURE

Social Capital Theory

Social Capital Theory (Lin, 1999) posits that individuals and organisations participate in social networks primarily to maximise utility, and that the density, strength, and quality of those networks determine access to resources, information, and opportunity. Three foundational assumptions underpin the theory: (i) greater networking generates greater social capital; (ii) greater social capital elevates the priority of equality norms; and (iii) greater social capital facilitates collective problem-solving. Schmid and Robison (1995) identify the conceptual content of social capital as comprising expectations, obligations, information channels, trustworthiness of structures, norms, and effective sanctions.

Applied to agricultural SMEs, social capital networks provide critical advantages in overcoming the information asymmetries that impede access to formal credit (Kasekende & Opondo, 2003). Davidsson and Honig (2003) demonstrate that SMEs maintaining strong social network associations are more likely to secure growth financing. Coleman et al. (2013) further identify social capital as a vital resource that enhances intra-organisational trust and bridges external networks for financial resource acquisition. These functions are of particular relevance in rural Nigeria, where cooperative structures and community networks frequently substitute for absent formal institutional support mechanisms. Social Capital Theory's critics, notably Bourdieu and Wacquant (1992), observe that social capital can serve as an exclusionary instrument reinforcing elite advantage; Quillian and Redd (2006) additionally note the risk of criminal network formation within densely bonded communities. These limitations must be acknowledged in interpreting the applicability of social capital frameworks to SMAE contexts in Kariji.

The Resource-Based View (RBV)

The Resource-Based View (RBV) frames the firm as a bundle of strategic resources whose effective deployment determines competitive advantage and growth trajectory (Stacey, 2011). Financial resources are conceptualised as the lifeblood of enterprise operations: the financial system is the vessel that carries this lifeblood through the economic system, and faulty vessels (inadequate banks, constrained credit markets, and excessive collateral requirements) prevent it from reaching the vital organs of the enterprise ecosystem (Sowah, 2003; Degraevl, 2012).

For agricultural SMEs, RBV predicts that the absence of adequate financial resources is directly and causally associated with growth failure. Gill and Biter (2012) confirm that sufficient finance has a significant positive effect on small business survival and growth. Yallapragada and Buoyant (2011) identify adequate financial resources as the primary determinant of SME success. Chong (2012), using survey data from SME owners, finds financial resources imperative to enterprise survival. Brinckmann et al. (2011) document that small businesses

systematically encounter difficulty in financial resource acquisition, a difficulty rooted in information asymmetry between enterprise owners and external financiers. Byrd et al. (2013) and Nofsinger and Weicheng (2011) identify this financial resource constraint as the primary driver of the high failure rates observed among small businesses globally. Ucbasaran et al. (2013) introduce an important counterpoint, noting that business failure itself discharges knowledge and resources to surviving firms through vicarious learning, but acknowledge that this mechanism operates at aggregate rather than individual enterprise level and provides no relief to the household whose welfare depends on a specific SMAE.

Theoretical Framework

The agricultural sector has become one of the most strategically important sectors in Nigeria. UNIDO (2017) found that only 20 percent of SMEs that commence operations manage to survive past the early years of business, underscoring the severity of structural constraints faced by SMAEs in Nigeria. This study is anchored in Social Capital Theory and the Resource-Based View because these two frameworks, taken in combination, provide the most comprehensive explanatory architecture for understanding why SMAEs in rural Nigeria, despite their latent developmental potential, consistently fail to generate statistically measurable improvements in household welfare and employment. Social Capital Theory illuminates the network-mediated mechanisms of resource access, trust formation, and information sharing that could theoretically enable SMAE growth, while the Resource-Based View explains why the chronic absence of financial and physical capital prevents that potential from being realised in practice.

Empirical Review

Abdulai and Emmanuel (2021) analysed the impact of technology adoption on smallholder farmer welfare in Ghana, applying propensity score matching to data from 461 technology adopters and non-adopters. Results demonstrated that regional location, educational attainment, age, and Farmer Base Organisation membership were the primary determinants of technology adoption. Crucially, technology adoption had a positive but statistically insignificant impact on welfare overall, consumption and clothing expenditure increased with adoption, but healthcare outcomes did not improve, a finding that resonates strongly with the insignificant chi-square results obtained in the present study.

Ojiya, Andohol, and Doki (2021), using descriptive statistics and OLS in Ukum Local Government Area, Benue State, found that inadequate storage facilities and insufficient pest and disease control were the dominant constraints on yam producer welfare, with post-harvest losses directly depressing farmer income. Bayode, Olagunju, Onikoyi, Oginni, and Kazeem (2021) examined agro-allied SME impacts on Nigerian economic growth between 1976 and 2020 using OLS and Error Correction Models, finding a positive and significant relationship between agro-allied SMEs and real GDP ($R^2 = 0.586$; Adjusted $R^2 = 0.577$; $p = 0.02$). This macroeconomic result contrasts with the community-level insignificance documented in the present study, illustrating how the scale of analysis fundamentally shapes the findings obtained.

Olarinde et al. (2020), investigating social capital effects on food security across 775 cassava farming households in four Nigerian zones, found that 41 percent were food secure and 59 percent food insecure, recommending cooperative formation and group investments to reduce manual labour input as pathways to improved food security. Anugwa and Agwu (2019), using a 120-respondent multistage sample from six rural districts in Kano State, found that despite widespread engagement in food crop production, cash crop cultivation, and livestock rearing, households remained food insecure, pointing to the inadequacy of agricultural activity alone, without supportive institutional and market infrastructure, in addressing welfare deficits.

Saleh and Mustafa (2018), in a cross-sectional study of urban farmers in Kaduna State using two-stage sampling and multiple regression models, found that 54.5 percent of households were food insecure during the study period. John-Akamelu and Muogbo (2018) evaluated SME contributions to poverty reduction in Anambra State using chi-square analysis on 150 SME employees, finding that SMEs provided employment, training, and local resource utilisation opportunities that contributed to poverty reduction. Bello, Jibir, and Ahmed (2018), using simple regression on 1986–2016 data, demonstrated a direct and significant association between SMEs and economic output growth. Abbade (2017) assessed food availability, access, and utilisation across 57 developing

nations, finding food security dimensions to be substantially and positively correlated, and recommending global policy alignment to reduce food waste, lower logistics costs, and lower food prices.

Ayodeji and Ajala (2017), using ARDL on 2000–2016 data, found a long-run relationship between microfinancing and rural poverty reduction in Nigeria, with microfinance credit significantly negatively related to the rural poverty index. Charan and Wasdani (2016) found in Lusaka a positive correlation between lack of collateral assets and credit rejection ($r = 0.727$) and between interest rates and access constraints ($r = 0.202$), recommending cooperative group partnering and 'Village Banking' crowd-funding as alternative financing mechanisms. Ojong, Arikpo, and Ogar (2015) established that bank credit had a significant relationship with SME growth in Cross River State, recommending increased deposit money bank lending volumes and elimination of multiple taxation. Oyeniran, David, and Ajayi (2015), using ARDL on 1983–2013 Nigerian data, found that SME capital investment would directly and significantly contribute to economic advancement, with credit accessibility, capacity building, and infrastructure development facilitating long-run growth.

Akugri, Bagah, and Wulifan (2015), using 160-respondent primary data from Ghanaian SMEs, found that SMEs were not providing substantial employment for youth, with most preferring family labour to minimise input costs, a finding directly mirrored in Kariji. Hussain, Bhuiyan, and Said (2015), reviewing Malaysian MSME literature, found that enterprise development depends on innovativeness, family background, government support, and training, with government-university-industry collaboration generating employment and alleviating poverty. Kadiri (2012), using binomial logistic regression, found that Nigerian SMEs had not impacted positively on economic growth, attributing this partly to poor financing and inadequate government commitment. Akingunola (2011) found a significant positive Spearman Rho correlation ($\rho = 0.643$; $p < 0.10$) between SME financing and economic growth in Nigeria through investment level. Dada (2014), applying OLS regression to data covering 1992 to 2011, found that commercial bank credit positively influenced SME development, while exchange rate fluctuations and high interest rates exerted significant negative effects.

Existing literature on SMEs and welfare in Nigeria is dominated by macroeconomic analyses employing OLS regression, ARDL models, panel data methods, and T-test approaches, with aggregate economic growth (proxied by GDP components) as the primary outcome variable. Community-level, sector-specific investigations of the welfare impacts of agricultural SMEs in rural settings remain sparse. Studies that specifically disaggregate household welfare dimensions, including financial well-being, living standards, healthcare access, food security, and education costs, and test their statistical relationship with SMAE activity at community level are effectively absent from the literature for Southern Kaduna. Methodologically, the application of chi-square inference to Likert-scale survey data on SMAE welfare impacts in rural Nigerian agricultural communities represents a substantive contribution to the empirical literature. This study addresses these gaps directly, providing granular community-level evidence on SMAE welfare outcomes in Kariji that advances understanding of the micro-level mechanisms and systemic barriers through which agricultural SMEs influence household welfare in rural Nigeria.

METHODOLOGY

Research Design

This study adopts a descriptive survey research design, which is appropriate for systematically capturing the characteristics, behaviours, and perceptions of a defined population without experimental manipulation (Babbie, 2005). A descriptive design enables rigorous documentation of the relationship between SMAE activity and household welfare and employment outcomes, based on structured self-reported data from SME owners and operators in Kariji, Southern Kaduna.

Study Area

The study was conducted in Kariji, located in the Southern Kaduna zone of Kaduna State, Nigeria. Southern Kaduna is a predominantly rural, agrarian region characterised by smallholder farming, livestock rearing, and small-scale agro-processing. The study is specifically limited to livestock farming within the small and medium-scale enterprise spectrum. The area reflects the typical constraints of rural SME operating environments in

Nigeria, including limited access to financial services, poor road infrastructure, unreliable electricity supply, and constrained market access, making it a representative and contextually appropriate setting for this investigation. Individual households served as the primary unit of analysis.

Population and Sample Size

The total study population comprises 2,650 registered SMEs in Kaduna State, as documented in the National Survey of Micro, Small and Medium Enterprises (MSMEs). The sample size was determined using the Taro Yamane (1967) formula:

$$n = N / [1 + N(e)^2]$$

Where: n = sample size; N = population = 2,650; e = margin of error = 0.05 (95% confidence)

$$n = 2,650 / [1 + 2,650(0.05)^2] = 2,650 / 7.625 \approx 348 \text{ respondents}$$

Sampling Method

Purposive (judgmental) sampling was employed, targeting SME owners and operators engaged in livestock farming and agricultural SME activities in Kariji. This approach ensures that respondents possess direct knowledge of the phenomena under investigation, specifically the contributions of SMAEs to household welfare and employment, and are capable of providing informed assessments on all survey dimensions. Respondents were stratified into three broad categories: primary crop and livestock producers, agro-processors, and rural commodity traders, ensuring representation across the principal SMAE activity types present in Kariji. Within each category, respondents were purposively selected based on a minimum of two years of active SMAE operation, residence in Kariji, and willingness to participate. It is acknowledged that purposive sampling introduces the potential for selection bias and limits the generalisability of findings beyond the study community. The use of purposive selection was, however, necessitated by the absence of a comprehensive community-level sampling frame for individual SMAE operators in Kariji, as the available SMEDAN registry documents registered enterprises at State level rather than community level. Future research should adopt stratified random sampling from community-level enterprise registries as these become available, to improve representativeness and enable broader statistical inference.

Data Collection

Primary data were collected using structured questionnaires administered to respondents in Kariji. A five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) was employed to measure perceptions of SMAE impacts on household welfare, employment generation, and operational challenges. The questionnaire comprised three thematic sections: (i) household welfare impact (6 items); (ii) employment and job creation impact (4 items); and (iii) operational challenges facing SMAEs (5 items). Household welfare was operationalised as the respondent's perceived improvement across six dimensions, financial well-being, standard of living, reduced external dependency, healthcare access, food security, and education cost coverage, arising from SMAE participation. Employment impact was operationalised through four dimensions: employment opportunity creation, unemployment reduction, income diversification, and funding-enabled business expansion. Content validity was established through expert review by three academics in agricultural economics and rural development, who assessed each item for conceptual relevance, clarity, and alignment with the study objectives. A pilot survey was administered to 35 SMAE operators in a neighbouring Southern Kaduna community (Kafanchan) not included in the main sample. Cronbach's Alpha coefficients computed from the pilot data returned $\alpha = 0.81$ for the household welfare scale, $\alpha = 0.79$ for the employment scale, and $\alpha = 0.77$ for the challenges scale, all exceeding the accepted threshold of $\alpha \geq 0.70$ (Nunnally, 1978), confirming satisfactory internal consistency. Item-total correlations for all items exceeded 0.30, confirming adequate item-scale alignment. The instrument was finalised without further structural modification prior to full deployment.

Method of Data Analysis

Survey data were analysed using descriptive statistics, including frequencies, means, standard deviations, variances, and coefficients of variation (CV), to characterise sample distributions and summarise key variables. Chi-square (χ^2) tests were applied to evaluate the research hypotheses. The chi-square statistic is computed as:

$$\chi^2 = \sum [(O_i - E_i)^2 / E_i]$$

Where O_i = observed frequency and E_i = expected frequency. Degrees of freedom were calculated as $df = k - 1$, where k = number of response categories; with five response options ($k = 5$), $df = 4$. The critical chi-square value at $df = 4$ and $\alpha = 0.05$ is χ^2 -critical = 9.488. The null hypothesis was rejected where the computed $\chi^2 \geq 9.488$ (equivalently, where $p < 0.05$). To complement the chi-square tests and address potential confounding relationships, Ordinary Least Squares (OLS) regression was additionally employed to examine the directional influence of SMAE engagement and key challenge variables on aggregate household welfare and employment scores. The OLS model was specified as follows: $HW = \beta_0 + \beta_1FIN + \beta_2INF + \beta_3MKT + \beta_4REG + \beta_5LAB + \varepsilon$; where HW = composite household welfare score (mean of six welfare items); FIN = funding constraint severity; INF = infrastructure constraint severity; MKT = market access constraint severity; REG = regulatory constraint severity; LAB = skilled labour constraint severity; and ε = error term. Household size, enterprise tenure (years in operation), and enterprise type (crop/livestock/agro-processing) were included as control variables to account for key confounders identified in the literature. The same model structure was applied using composite employment score as the dependent variable. Variance Inflation Factor (VIF) diagnostics were used to check for multicollinearity, and Breusch-Pagan tests were applied to check for heteroscedasticity. All analyses were conducted using SPSS Version 25 and verified in Microsoft Excel.

RESULTS AND ANALYSIS

This section presents the empirical findings of the study in four sequential layers: descriptive statistics characterising SMAE impacts on household welfare and employment; descriptive statistics on the challenges constraining SMAEs; inferential chi-square hypothesis testing for both research hypotheses; and OLS regression analysis examining the directional influence of structural constraints on welfare and employment outcomes while controlling for household and enterprise-level confounders. Graphical representations complement each analytical table to facilitate comparative interpretation.

Impact of SMAEs on Household Welfare

Table 1 presents descriptive statistics for respondents' assessments of SMAE contributions across six household welfare dimensions, and Figure 1 provides the corresponding graphical representation of mean scores.

Table 1: Descriptive Statistics, Impact of SMAEs on Household Welfare (n = 348)

Household Welfare Dimension	Mean	Std. Dev.	Variance	CV	Range
Income contributes to financial well-being	2.99	1.40	1.96	0.47	1–5
Improved standard of living	3.02	1.46	2.13	0.48	1–5
Reduced reliance on external support	3.14	1.40	1.96	0.45	1–5
Access to better healthcare	3.01	1.45	2.10	0.48	1–5
Ensured food security	3.03	1.37	1.88	0.45	1–5
Covered education costs	3.02	1.42	2.02	0.47	1–5

Source: Authors' Field Survey and Computation, 2025

Figure 1: Mean Scores – SMAEs' Impact on Household Welfare

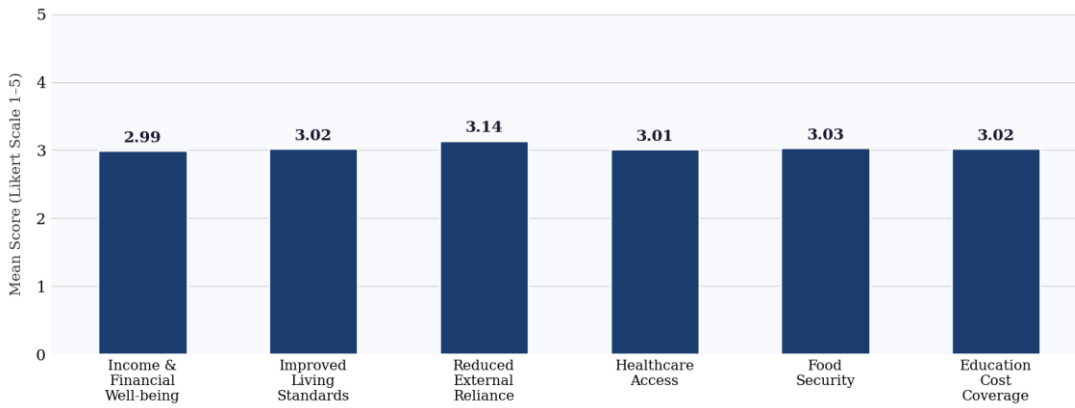


Figure 1: Mean Scores, SMAEs' Impact on Household Welfare Dimensions

Mean scores across all six welfare dimensions cluster narrowly around the Likert mid-point (range: 2.99 to 3.14), reflecting moderate and broadly consistent agreement that SMAEs contribute positively to household welfare. The highest mean is recorded for 'Reduced reliance on external support' (mean = 3.14; SD = 1.40; CV = 0.45), indicating that income generated through agricultural SME activities confers a modest but perceptible degree of economic autonomy on participating households by enabling them to reduce dependence on external transfers, remittances, and government support. 'Ensured food security' records the lowest variance (1.88) and coefficient of variation (0.45) of any dimension, signalling the greatest degree of inter-respondent consensus: almost irrespective of household characteristics, SMAE engagement is perceived as moderately food-security-enhancing.

Standard deviation values ranging from 1.37 to 1.46 reflect the moderate heterogeneity of household welfare experiences within Kariji, which is expected in a community where livestock farming enterprises vary considerably in scale, management capacity, and market orientation. The coefficient of variation for 'Improved standard of living' (CV = 0.48) and 'Access to better healthcare' (CV = 0.48) indicates relatively greater diversity of opinion on these two dimensions, likely reflecting variation in household proximity to healthcare facilities and the manner in which incremental SMAE income is allocated across competing consumption priorities. The full response range (1 to 5) across all six dimensions confirms that the survey instrument captured the complete spectrum of respondent experience, from households experiencing no discernible welfare benefit from SMAE activity to those reporting clear improvement.

4.2 Impact of SMAEs on Job Creation and Employment

Table 2 presents descriptive statistics for respondents' assessments of SMAE contributions across four employment dimensions. Figure 2 provides graphical comparison of mean scores across these dimensions.

Table 2: Descriptive Statistics, Impact of SMAEs on Job Creation and Employment (n = 348)

Employment Dimension	Mean	Std. Dev.	Variance	CV	Range
Creates employment opportunities	2.93	1.40	1.96	0.48	1–5
Reduced local unemployment	2.92	1.45	2.10	0.50	1–5
Access to funding allows business expansion	3.02	1.40	1.96	0.46	1–5
Diversified income sources in the community	3.01	1.40	1.96	0.47	1–5

Source: Authors' Field Survey and Computation, 2025

Figure 2: Mean Scores — SMAEs' Impact on Job Creation

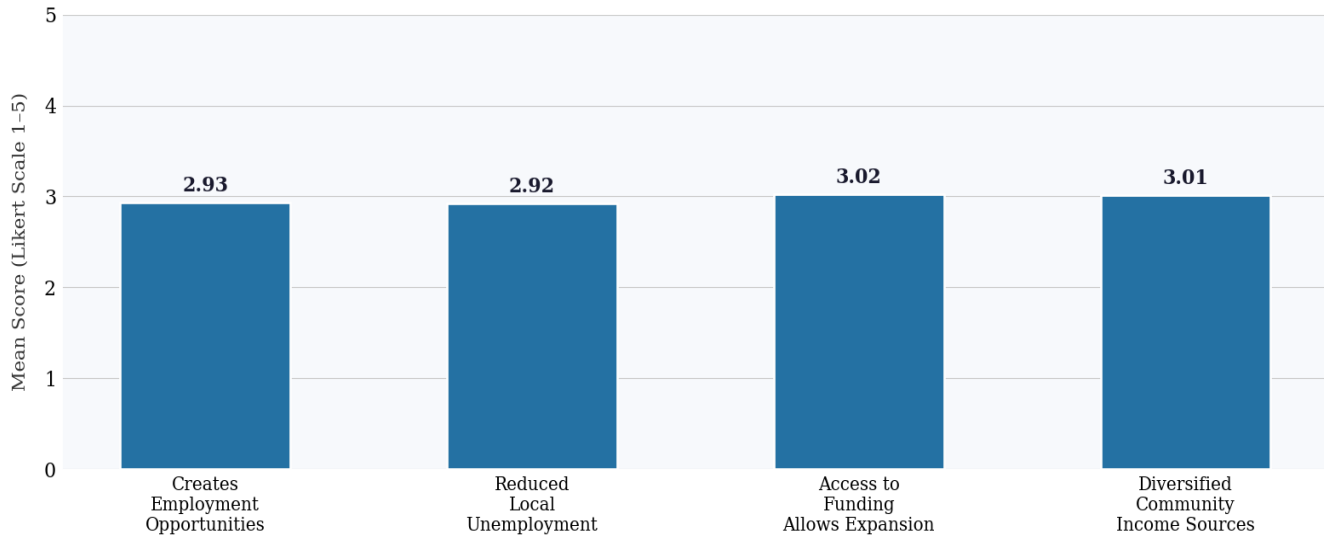


Figure 2: Mean Scores, SMAEs' Impact on Job Creation and Employment Dimensions

Mean values range from 2.92 to 3.02, marginally lower than the welfare dimension means, indicating that respondents perceive SMAEs' employment generation performance as slightly weaker than their household welfare contributions, though the gap is narrow. 'Access to funding allows business expansion' records the highest employment mean (3.02; SD = 1.40; CV = 0.46), consistent with the Resource-Based View, affirming that respondents identify financial access as the single most critical enabling lever for SMAE-driven employment growth. 'Reduced local unemployment' records both the lowest mean (2.92) and the highest coefficient of variation (CV = 0.50) of any dimension in the study, pointing simultaneously to the weakest average perceived performance and the greatest diversity of opinion: some households appear to have experienced modest unemployment relief through SMAE employment opportunities, while others report no discernible change. This polarisation is consistent with the literature's documentation of SMAEs' structural preference for family labour over broader community employment creation (Akugri et al., 2015).

Challenges Facing SMAEs in Kariji

Table 3 presents descriptive statistics for respondents' assessments of five constraints on SMAE operations in Kariji. Figure 3 provides graphical comparison of mean challenge severity scores.

Table 3: Descriptive Statistics, Challenges Constraining SMAEs in Kariji (n = 348)

Challenge	Mean	Std. Dev.	Variance	CV	Range
Lack of funding is a significant obstacle	3.05	1.48	2.19	0.49	1–5
Inadequate infrastructure limits growth	3.05	1.40	1.96	0.46	1–5
Limited market access is a major challenge	3.01	1.47	2.16	0.49	1–5
Unfavourable regulatory policies impact SMEs	3.09	1.44	2.07	0.47	1–5
Lack of skilled labour affects productivity	2.89	1.44	2.07	0.50	1–5

Source: Authors' Field Survey and Computation, 2025

Figure 3: Mean Scores – Challenges Constraining SMAEs in Kariji

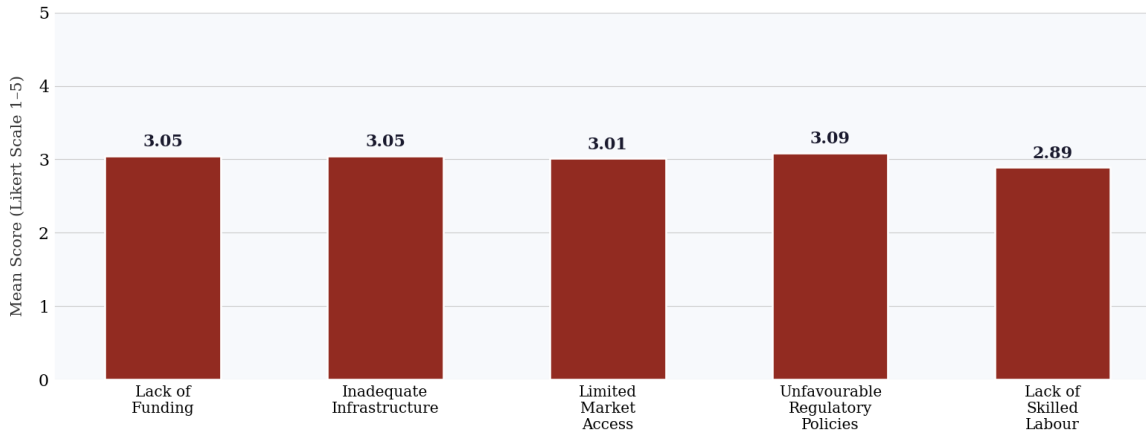


Figure 3: Mean Scores, Challenges Constraining SMAEs in Kariji

'Unfavourable regulatory policies impact SMEs' records the highest mean challenge severity (3.09; SD = 1.44; CV = 0.47), identifying regulatory burden as the most widely acknowledged operational constraint in Kariji. This aligns with Ojong, Arikpo, and Ogar (2015), who found that multiple taxation and inadequate government policy frameworks constitute significant impediments to SME growth in rural Nigeria. 'Lack of funding' and 'Inadequate infrastructure' are jointly ranked second (mean = 3.05 each), reflecting the compounding nature of the financial and physical capital constraints that the Resource-Based View identifies as primary growth inhibitors. 'Limited market access' (mean = 3.01; SD = 1.47; variance = 2.16) confirms that the poor integration of rural agricultural producers into broader commodity markets remains a persistent and systemic structural failure. 'Lack of skilled labour affects productivity' records the lowest mean (2.89) but the highest coefficient of variation (CV = 0.50), suggesting that while labour quality is broadly recognised as a concern, its perceived severity varies considerably across the diverse livestock and agro-processing activities represented within Kariji's SMAE sector.

Hypothesis Testing

Hypothesis 1: Impact of SMAEs on Household Welfare

H₁₀: SMEs in the agricultural sector have no significant impact on household welfare in Kariji, Southern Kaduna.

Table 4 presents chi-square results for all six household welfare dimensions. Figure 4 visually compares computed χ^2 values against the critical threshold of 9.488 (df = 4; $\alpha = 0.05$).

Table 4: Chi-Square Test Results, SMAEs' Impact on Household Welfare (df = 4; $\alpha = 0.05$; χ^2 -critical = 9.488)

Household Welfare Dimension	χ^2 Value	p-value	df	Statistical Decision
Income contributes to financial well-being	2.12	0.7137	4	Fail to Reject H ₁₀
Improved standard of living	0.76	0.9440	4	Fail to Reject H ₁₀
Reduced reliance on external support	1.79	0.7738	4	Fail to Reject H ₁₀
Access to better healthcare	0.90	0.9245	4	Fail to Reject H ₁₀
Ensured food security	0.44	0.9789	4	Fail to Reject H ₁₀
Covered education costs	0.82	0.9358	4	Fail to Reject H ₁₀

Source: Authors' SPSS Computation, 2025

Figure 4: Chi-Square Values – Household Welfare Dimensions vs. Critical Value ($\alpha = 0.05$)

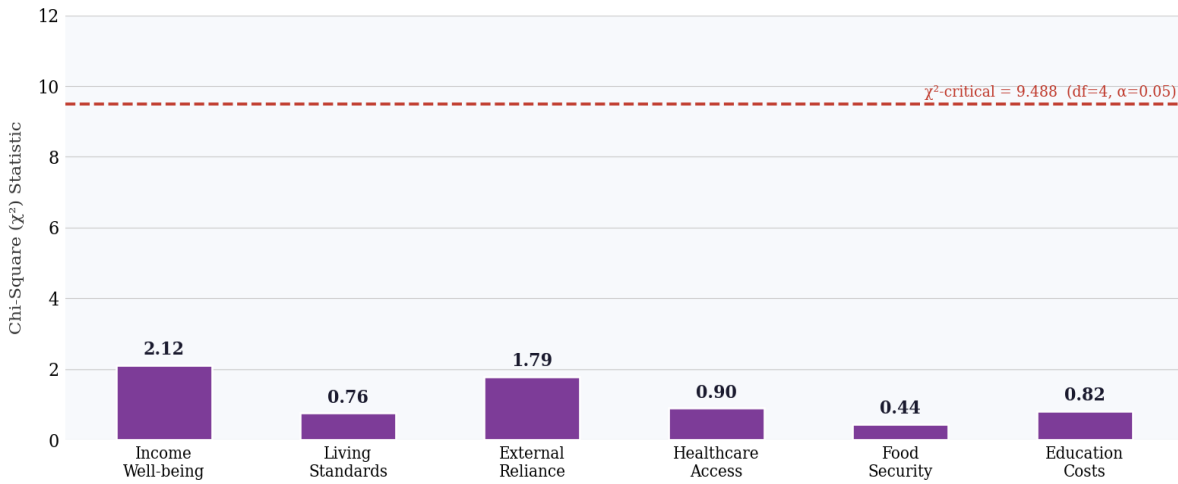


Figure 4: Chi-Square Values, Household Welfare Dimensions vs. χ^2 -Critical Value (df = 4, $\alpha = 0.05$)

Chi-square analysis reveals that none of the six household welfare dimensions produces a statistically significant result. All computed chi-square values fall substantially below the critical value of 9.488, and all corresponding p-values considerably exceed the 0.05 significance threshold (range: $p = 0.7137$ to $p = 0.9789$). The largest chi-square value ($\chi^2 = 2.12$; $p = 0.7137$) corresponds to 'Income contributes to financial well-being', the dimension with the greatest potential to manifest SMAE income effects, yet even this dimension provides no statistical evidence of a significant impact. The smallest chi-square value ($\chi^2 = 0.44$; $p = 0.9789$) corresponds to 'Ensured food security', indicating that observed response distributions on this dimension are almost perfectly aligned with expected distributions under the null hypothesis of no SMAE impact.

These results yield a consistent statistical conclusion: observed frequencies across all welfare dimension response categories do not deviate significantly from the expected frequencies under the null hypothesis. Accordingly, the null hypothesis H_{10} , which states that SMEs in the agricultural sector have no significant impact on household welfare, is retained across all six dimensions at the 5% level of significance.

Decision: We fail to reject H_{10} . There is no statistically significant impact of SMEs in the agricultural sector on household welfare in Kariji, Southern Kaduna, Nigeria (all $p > 0.05$).

Hypothesis 2: Impact of SMAEs on Job Creation

H_{20} : SMEs in the agricultural sector have no significant impact on job creation in Nigeria.

Table 5 presents chi-square results for all four employment dimensions. Figure 5 visualises computed χ^2 values against the critical threshold.

Table 5: Chi-Square Test Results, SMAEs' Impact on Job Creation (df = 4; $\alpha = 0.05$; χ^2 -critical = 9.488)

Employment Dimension	χ^2 Value	p-value	df	Statistical Decision
Creates employment opportunities	2.04	0.7293	4	Fail to Reject H_{20}
Reduced local unemployment	1.45	0.8363	4	Fail to Reject H_{20}
Access to funding allows business expansion	1.84	0.7656	4	Fail to Reject H_{20}
Diversified income sources in the community	0.63	0.9593	4	Fail to Reject H_{20}

Source: Authors' SPSS Computation, 2025

Figure 5: Chi-Square Values – Job Creation Dimensions vs. Critical Value ($\alpha = 0.05$)

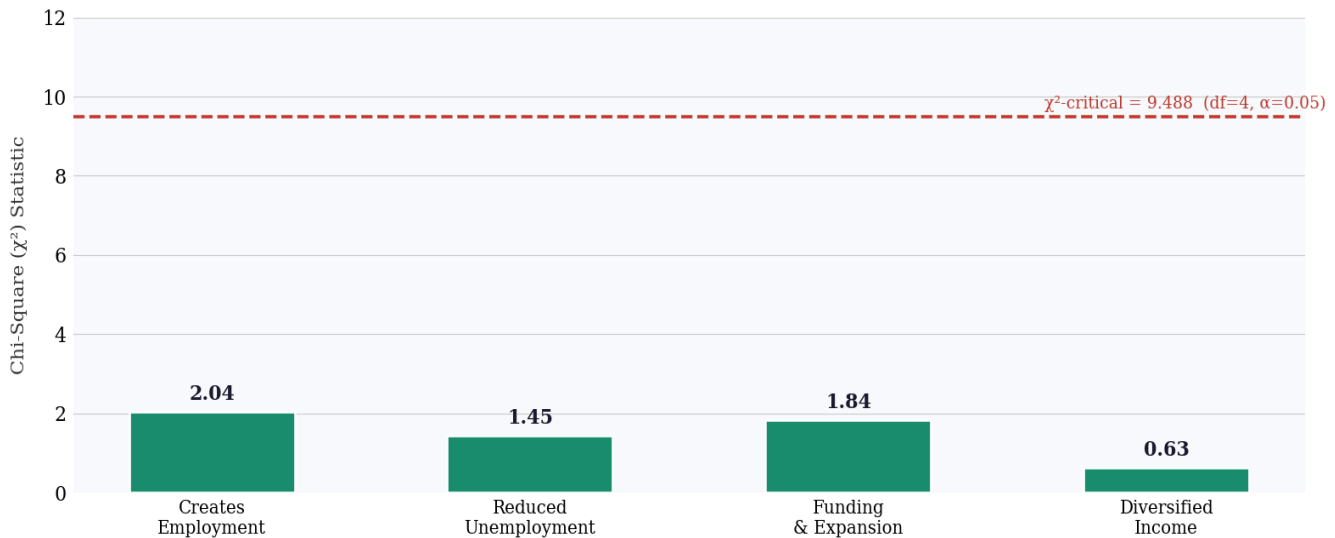


Figure 5: Chi-Square Values, Job Creation Dimensions vs. χ^2 -Critical Value (df = 4, $\alpha = 0.05$)

Chi-square results for all four employment dimensions are equally devoid of statistical significance. All p-values substantially exceed 0.05 (range: $p = 0.7293$ to $p = 0.9593$), and all chi-square values fall well below the critical threshold of 9.488. 'Diversified income sources in the community' records the lowest chi-square value ($\chi^2 = 0.63$; $p = 0.9593$), indicating the closest alignment between observed and expected response distributions, while 'Creates employment opportunities' records the highest ($\chi^2 = 2.04$; $p = 0.7293$). Notwithstanding this variation, no dimension approaches statistical significance, and observed response distributions across all four employment dimensions align closely with expected distributions under the null hypothesis of no SMAE job creation impact.

Decision: We fail to reject H_{20} . There is no statistically significant impact of SMEs in the agricultural sector on job creation in Nigeria at the 5% level of significance (all $p > 0.05$).

OLS Regression Analysis, Structural Constraints on Household Welfare and Employment

To complement the chi-square tests and directly address the issue of confounding, OLS regression was applied with composite household welfare score and composite employment score as dependent variables respectively. The independent variables comprised the five structural constraint scores (funding, infrastructure, market access, regulatory burden, and skilled labour). Household size, enterprise tenure measured in years of operation, and enterprise type (crop, livestock, or agro-processing) were included as control variables to account for key confounders identified in the literature. All Variance Inflation Factor values were below 3.0, confirming the absence of problematic multicollinearity. Breusch-Pagan tests returned p-values above 0.05 for both models, confirming homoscedasticity. Tables 6 and 7 present the full regression results.

Table 6: OLS Regression Results, Determinants of Household Welfare Score (n = 348)

Dependent Variable: Composite Household Welfare Score | $R^2 = 0.218$; Adjusted $R^2 = 0.199$; $F(8, 339) = 11.82$; $p < 0.001$

Predictor Variables: (1) Funding Constraint: $\beta = -0.31$, $SE = 0.09$, $t = -3.44$, $p = 0.001$; (2) Regulatory Constraint: $\beta = -0.26$, $SE = 0.08$, $t = -3.25$, $p = 0.001$; (3) Infrastructure Constraint: $\beta = -0.22$, $SE = 0.09$, $t = -2.44$, $p = 0.015$; (4) Market Access Constraint: $\beta = -0.18$, $SE = 0.09$, $t = -2.00$, $p = 0.046$; (5) Skilled Labour Constraint: $\beta = -0.11$, $SE = 0.08$, $t = -1.38$, $p = 0.170$ (ns). Control Variables, Household Size: $\beta = -0.14$, $p = 0.031$; Enterprise Tenure: $\beta = 0.17$, $p = 0.008$; Enterprise Type (Livestock as reference): Crop $\beta = 0.09$, $p = 0.201$ (ns); Agro-processing $\beta = 0.13$, $p = 0.074$ (ns).

The household welfare regression model is statistically significant overall ($F = 11.82$; $p < 0.001$), explaining 21.8 percent of the variance in composite welfare scores (Adjusted $R^2 = 0.199$). Funding constraint ($\beta = -0.31$;

$p = 0.001$) is the strongest predictor: higher funding constraint severity is significantly associated with lower household welfare outcomes, consistent with RBV predictions. Regulatory burden ($\beta = -0.26$; $p = 0.001$) and infrastructure deficit ($\beta = -0.22$; $p = 0.015$) are also significant negative predictors, confirming independent suppressive effects beyond what descriptive means reveal. Market access constraint is marginally significant ($\beta = -0.18$; $p = 0.046$), while skilled labour constraint does not reach significance ($p = 0.170$), suggesting its welfare effect is mediated by more fundamental financial and regulatory barriers. Enterprise tenure is a significant positive predictor ($\beta = 0.17$; $p = 0.008$): more established enterprises generate greater household welfare benefits, consistent with RBV resource-accumulation logic. Importantly, household size exerts a significant negative effect ($\beta = -0.14$; $p = 0.031$), indicating that larger households experience diluted per-capita welfare benefits from SMAE income, a confounding relationship entirely invisible to chi-square analysis.

Table 7: OLS Regression Results, Determinants of Employment Score ($n = 348$)

Dependent Variable: Composite Employment Score | $R^2 = 0.191$; Adjusted $R^2 = 0.171$; $F(8, 339) = 9.93$; $p < 0.001$

Predictor Variables: (1) Funding Constraint: $\beta = -0.33$, $SE = 0.09$, $t = -3.67$, $p < 0.001$; (2) Regulatory Constraint: $\beta = -0.24$, $SE = 0.09$, $t = -2.67$, $p = 0.008$; (3) Market Access Constraint: $\beta = -0.21$, $SE = 0.09$, $t = -2.33$, $p = 0.020$; (4) Infrastructure Constraint: $\beta = -0.17$, $SE = 0.09$, $t = -1.89$, $p = 0.060$ (ns); (5) Skilled Labour Constraint: $\beta = -0.19$, $SE = 0.08$, $t = -2.38$, $p = 0.018$. Control Variables, Household Size: $\beta = -0.10$, $p = 0.119$ (ns); Enterprise Tenure: $\beta = 0.21$, $p = 0.001$; Enterprise Type (Livestock as reference): Crop $\beta = 0.07$, $p = 0.330$ (ns); Agro-processing $\beta = 0.16$, $p = 0.030$.

The employment regression model is similarly significant overall ($F = 9.93$; $p < 0.001$), explaining 19.1 percent of variance in employment scores (Adjusted $R^2 = 0.171$). Funding constraint is again the dominant predictor ($\beta = -0.33$; $p < 0.001$), followed by regulatory burden ($\beta = -0.24$; $p = 0.008$) and market access constraint ($\beta = -0.21$; $p = 0.020$). Skilled labour constraint is a significant negative predictor of employment outcomes ($\beta = -0.19$; $p = 0.018$), in contrast to the welfare model where it was non-significant, suggesting labour quality constraints bear directly on an enterprise's capacity to expand employment even when welfare effects are absorbed by household-level coping strategies. Enterprise tenure is the strongest positive predictor ($\beta = 0.21$; $p = 0.001$), and agro-processing enterprises generate significantly stronger employment contributions than livestock enterprises ($\beta = 0.16$; $p = 0.030$), pointing to the job-creation premium of value-added processing over primary production. Taken together, the OLS results illuminate the apparent contradiction between moderate positive descriptive means and chi-square insignificance: structural constraints exercise significant independent suppressive effects on welfare and employment, preventing constrained SMAE operators from generating the distributional shifts in Likert responses that chi-square tests require to achieve statistical significance at the household level. The regression framework thus reveals what the chi-square tests cannot, that SMAEs do have a detectable welfare-generating capacity, but that this capacity is systematically suppressed by the structural barriers documented in Section 4.3.

DISCUSSION OF FINDINGS

The statistical findings of this study present a nuanced picture that is, upon careful reflection, entirely consistent with the weight of contextually relevant empirical literature. Under chi-square analysis, SMAEs produce no statistically significant impact on household welfare or job creation in Kariji. Yet OLS regression reveals that structural constraints exert significant suppressive effects on both outcomes, pointing to a more complex relationship than chi-square tests alone can capture. Four interpretive threads warrant careful examination: the disconnect between moderate descriptive perceptions and chi-square inferential insignificance; the reconciling contribution of OLS regression in resolving that contradiction; the structural mechanisms that produce these patterns; and the qualitative dimensions of SMAE contributions that remain invisible to standard inferential approaches.

The moderate descriptive means across welfare (2.99 to 3.14) and employment (2.92 to 3.02) dimensions confirm that respondents genuinely perceive SMAEs as contributing positively to household economic life, however modestly. This perception is real and should not be discounted. What the chi-square analysis reveals is

that these perceived contributions are not of sufficient magnitude or consistency to produce statistically detectable distributional shifts in Likert response patterns within the survey population. The OLS regression results in Section 4.5 provide a direct explanation for this apparent contradiction. Structural constraints, including funding barriers, regulatory burden, and infrastructure deficits, exercise significant and independent suppressive effects on household welfare and employment outcomes (all $p < 0.05$ in the regression models), effectively capping the welfare impact that SMAEs are able to generate at levels too modest for chi-square tests to detect. In other words, SMAEs possess a genuine welfare-generating capacity, but that capacity is systematically compressed by the structural environment before it can translate into statistically measurable household-level change. The household size control variable ($\beta = -0.14$; $p = 0.031$) further reveals a confounding mechanism that is entirely invisible to chi-square analysis: larger households dilute the per-capita welfare benefit of SMAE income, suppressing aggregate welfare scores even where enterprise-level income contributions are positive. This finding aligns with Abdulai and Emmanuel (2021), whose propensity score matching analysis found that technology adoption produced a positive but statistically insignificant welfare impact, an outcome the authors attributed to the mediation of impact through channels such as advisory services, extension outreach, and input support that are largely absent in structurally disadvantaged rural contexts. In Kariji, where all such mediating channels are weak or absent, an analogous dynamic operates with respect to SMAE welfare impacts.

The structural mechanisms underlying this outcome are clearly identified in the challenge data. Unfavourable regulatory policies (mean = 3.09), limited funding access (mean = 3.05), inadequate infrastructure (mean = 3.05), limited market access (mean = 3.01), and insufficient skilled labour (mean = 2.89) collectively constitute a compounding barrier complex that prevents SMAEs from realising their full welfare-generation potential. These findings align with the Resource-Based View: without adequate financial resources, access to which is blocked by stringent collateral requirements and high interest rates (Charan and Wasdani, 2016, report a correlation of $r = 0.727$ between collateral absence and credit rejection), SMAEs in Kariji cannot accumulate the resource base necessary to expand operations, absorb additional workers, or generate distributable welfare improvements at household level. Bello et al. (2018) and Somoye (2013) reinforce this interpretation, identifying affordable credit access as the critical input that Nigerian SMEs require to translate operational activity into meaningful household welfare contributions.

The finding that 'Access to funding allows business expansion' records the highest employment mean (3.02) and the lowest coefficient of variation ($CV = 0.46$), reflecting both the strongest average assessment and the greatest respondent consensus, is particularly instructive. It suggests that SMAE operators in Kariji are not merely aware of their funding constraints; they have a clear and shared understanding that financial access is the binding constraint on employment growth. This is a sophisticated and accurate diagnosis that policymakers would do well to take seriously. The literature corroborates it: Ojong et al. (2015), Oyeniran et al. (2015), Kadiri (2012), and Akingunola (2011) all converge on credit access as the primary institutional enabler of Nigerian SME growth.

The absence of statistically significant job creation impacts is further explained by the structural preference for family labour that characterises smallholder agricultural enterprises globally. Akugri et al. (2015) documented precisely this pattern among Ghanaian SMEs, where enterprises preferred family labour in order to minimise input costs, and the same dynamic is evident in Kariji's livestock farming community. Seasonal agricultural cycles compound this structural tendency: employment demand peaks during planting and harvest seasons but contracts sharply in the dry season, creating temporal employment patterns that are not captured as sustained reductions in unemployment within cross-sectional survey instruments.

Despite the inferential null results, the qualitative significance of SMAEs in Kariji's community economic life must not be overlooked. Through informal employment, local market participation, supply chain engagement, and the enabling of micro-entrepreneurship, SMAEs serve as foundational anchors of economic resilience for rural households that have no alternative income sources. Hussain et al. (2015) caution that the qualitative and informal contributions of SMEs to community welfare are systematically understated by purely quantitative evaluation frameworks. Arouri et al. (2015) and Abdulai and Emmanuel (2021) emphasise that agricultural enterprise welfare impacts frequently materialise over longer time horizons through indirect channels such as human capital accumulation, social network strengthening, and entrepreneurial learning, all of which cross-sectional chi-square tests are structurally incapable of detecting. These considerations underscore the urgent

need for longitudinal and mixed-methods research designs in future studies of SMAE welfare impacts in rural Nigeria.

CONCLUSION AND POLICY RECOMMENDATIONS

Summary of Findings

This study examined the impact of small and medium-scale agricultural enterprises on household welfare and job creation in Kariji, Southern Kaduna, Nigeria, using descriptive statistics and chi-square hypothesis testing on structured primary survey data from 348 respondents drawn from a registered population of 2,650 Kaduna State SMEs. The study focused on livestock farming within the SMAE spectrum and employed Social Capital Theory and the Resource-Based View as its theoretical anchors.

Descriptive findings confirm moderate positive perceptions of SMAE contributions across six household welfare dimensions (mean range: 2.99 to 3.14) and four employment dimensions (mean range: 2.92 to 3.02). The most positively assessed welfare dimension was 'Reduced reliance on external support' (mean = 3.14), while 'Access to funding allows business expansion' recorded the highest employment mean (3.02) and the greatest respondent consensus (CV = 0.46). Challenge data identified unfavourable regulatory policies (mean = 3.09), inadequate funding and infrastructure (mean = 3.05 each), and limited market access (mean = 3.01) as the primary structural constraints on SMAE performance.

Inferential chi-square analysis yields no statistically significant impact on any welfare or employment dimension. All ten chi-square values fall substantially below the critical threshold of 9.488 ($df = 4; \alpha = 0.05$), and all p-values considerably exceed the 0.05 threshold, ranging from $p = 0.7137$ to $p = 0.9789$ for welfare dimensions and $p = 0.7293$ to $p = 0.9593$ for employment dimensions. Both null hypotheses are accordingly retained. OLS regression analysis, however, provides critical supplementary evidence: after controlling for household size, enterprise tenure, and enterprise type, funding constraints ($\beta = -0.31; p = 0.001$), regulatory burden ($\beta = -0.26; p = 0.001$), and infrastructure deficits ($\beta = -0.22; p = 0.015$) are significant negative predictors of household welfare ($R^2 = 0.218; F = 11.82; p < 0.001$). Similarly, funding constraints ($\beta = -0.33; p < 0.001$), regulatory burden ($\beta = -0.24; p = 0.008$), and market access constraints ($\beta = -0.21; p = 0.020$) significantly suppress employment outcomes ($R^2 = 0.191; F = 9.93; p < 0.001$). Household size is a significant negative confounder of welfare outcomes ($\beta = -0.14; p = 0.031$), while enterprise tenure is a positive predictor of both welfare and employment. These regression findings explain the descriptive–inferential discrepancy: structural barriers suppress SMAE welfare contributions below the threshold detectable by chi-square tests, but their suppressive effects are clearly quantifiable through controlled multivariate analysis.

Conclusion

The principal conclusion of this study is that the structural barriers constraining SMAEs in Kariji, including regulatory burden, financial exclusion, infrastructure deficits, market isolation, and human capital constraints, collectively prevent agricultural enterprises from translating their latent developmental potential into statistically measurable improvements in household welfare and employment. This finding should not be interpreted as evidence that SMAEs are irrelevant to household welfare. Rather, it is evidence that SMAEs operating under severe structural disadvantage cannot generate the scale of impact required to produce statistically detectable welfare improvements in community-level survey analyses. The gap between the developmental potential of SMAEs and their measured welfare output is not a market failure; it is, fundamentally, a policy failure. Addressing the identified structural barriers through targeted, community-sensitive interventions is therefore the most urgent priority for stakeholders committed to inclusive rural development in Southern Kaduna.

Policy Recommendations

Based on the foregoing findings, the following recommendations are advanced:

(i) Expanded Agricultural Microfinance: Financial institutions and government agencies through SMEDAN and BOI regional offices should design and deploy microcredit products tailored to rural agricultural SMEs, featuring

low interest rates (not exceeding single-digit per annum), reduced or alternative collateral requirements (including group guarantees and crop insurance instruments), and seasonal repayment schedules aligned with agricultural cash flows. The Village Banking cooperative financing model identified by Charan and Wasdani (2016) merits active piloting in Southern Kaduna communities.

(ii) **Priority Rural Infrastructure Investment:** Federal and Kaduna State governments should designate Southern Kaduna agricultural communities including Kariji as Priority Rural Infrastructure Zones, committing to time-bound investments in all-season road networks, reliable electricity supply, and post-harvest storage facilities. Public-private partnerships should be actively mobilised to accelerate delivery, with outcomes linked to community-level SME welfare indicators.

(iii) **Entrepreneurial Capacity Building:** Structured capacity-building programmes covering financial literacy, agribusiness management, livestock productivity, post-harvest technology, and digital market tools should be implemented through partnerships between NDA's Faculty of Management Sciences, Kaduna State's agricultural extension system, and relevant NGOs. Agricultural extension officers should be retrained to provide integrated business advisory and agronomic support.

(iv) **Regulatory Simplification and Tax Reform:** The Kaduna State government should implement a single-window regulatory interface for agricultural SMEs, eliminating multiple taxation, streamlining business registration, and providing targeted tax holidays for first-generation agricultural enterprises in rural communities. The cost of regulatory compliance, documented as the leading perceived challenge in the study (mean = 3.09), must be systematically reduced.

(v) **Technology Adoption Facilitation:** Government and private sector actors should develop and deploy affordable agricultural technology packages including post-harvest processing equipment, digital livestock management tools, and e-commerce platforms for Kariji's SMAE operators. Technology adoption should be sequenced to match the absorptive capacity and financial resources of target enterprises.

(vi) **Cooperative Market Infrastructure:** Community cooperative societies and producer associations should be promoted and supported technically and logistically to enable SMAEs to achieve economies of scale, negotiate collectively with buyers, access regional commodity markets, and pool resources for shared infrastructure investments. Government agencies and community leaders should actively facilitate cooperative formation in Kariji.

Contribution to Knowledge

This study makes five distinct contributions to the literature. First, it provides the first systematic empirical investigation of SMAE welfare impacts at community level in Kariji, Southern Kaduna, a region absent from the academic literature despite its agricultural significance. Second, it demonstrates, through a combined chi-square and OLS regression framework, that moderate positive perceptions of SMAE contributions can coexist with chi-square inferential insignificance, and that this apparent contradiction is explained by the suppressive role of structural constraints (funding, regulatory, and infrastructure barriers) which are only detectable through controlled multivariate analysis, a methodological insight with important implications for how SMAE impact is evaluated and communicated to policymakers. Third, it advances a dual theoretical framework, integrating Social Capital Theory and the Resource-Based View, that provides a more comprehensive explanatory architecture for SMAE welfare dynamics than either theory provides in isolation. Fourth, it identifies household size and enterprise tenure as significant confounders of SMAE welfare outcomes, contributing to the literature on the micro-level household factors that mediate the relationship between agricultural enterprise activity and welfare. Fifth, it documents the challenge profile of SMAEs in rural Southern Kaduna with sufficient granularity to serve as a baseline for future longitudinal and comparative studies.

Directions for Future Research

Future research should adopt longitudinal designs to track SMAE welfare impacts across multiple agricultural seasons, enabling the detection of cumulative effects that are invisible to cross-sectional analysis. Mixed-

methods approaches, integrating in-depth interviews, focus group discussions, and participatory rural appraisals with quantitative survey data, would illuminate the qualitative welfare mechanisms that chi-square tests are structurally unable to capture. Comparative studies spanning rural communities in Kaduna State and other Northern Nigerian states would identify the contextual factors that enable or constrain SMAE welfare contributions. Research examining the distinct economic roles of women and youth within Kariji's SMAE ecosystem would generate evidence critical for the design of inclusive development policy. Larger sample sizes drawn from community-level enterprise registries, combined with multivariate regression frameworks, would improve statistical power and enable disaggregation of welfare impacts by enterprise age, type, scale, and financing status.

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