Assessing the Role of Technical Competency in Driving Business Growth among Pesticide Agro-Dealers in Lusaka, Zambia

Penlope Mwandu Bowa[1], Dr. A. Mwange[1]

The University of Zambia, Lusaka, Zambia

DOI: https://doi.org/10.47772/IJRISS.2026.100600112

Received: 11 May 2025; Accepted: 16 May 2026; Published: 18 June 2026

ABSTRACT

Introduction: Agro-dealers are critical intermediaries in the agricultural value chain, linking farmers to suppliers of inputs such as pesticides, fertilizers, and seeds. Their technical competency determines the quality of advisory services, compliance with regulations, and ultimately, business growth. Competent dealers enhance farmer yields and loyalty, translating into higher sales volumes and sustainable enterprise performance.

Purpose of the study: This study assessed the impact of technical competency on business growth among pesticide Agro dealers in Lusaka, Zambia.

Research Design and Methodology: The study employed a mixed-methods study by obtaining quantitative information from 235 agro-dealers using structured questionnaires who were randomly selected and qualitative information from 30 agro-dealers through in-depth interviews who were purposively selected. SPSS v27 analyzed quantitative data; thematic analysis handled qualitative insights.

Results: Key Findings: Quantitative results revealed that nearly half of the respondents (48.9%) were knowledgeable, while 32.2% were partially knowledgeable and 12.8% lacked adequate knowledge. Advisory services were positively associated with customer retention, with 56.2% of respondents agreeing or strongly agreeing that technical guidance increased repeat customers. Qualitative findings emphasized that product knowledge and advisory services-built trust, improved farmer outcomes, and sustained business growth. Technical competency in pest diagnosis, dosage calculation, and safety advice emerged as central to customer satisfaction and loyalty. The findings demonstrate that technical competency is not only a determinant of farmer productivity but also a strategic driver of agro-dealer competitiveness and sustainability. By strengthening advisory services, agro-dealers can differentiate themselves in the market, build long-term customer relationships, and expand their businesses.

Conclusion: Technical competency significantly influences business growth among pesticide agro-dealers in Lusaka by enhancing customer trust, retention, and satisfaction. Agro-dealers who invest in knowledge and advisory capacity achieve measurable improvements in sales growth and market resilience. Targeted training programmes, certification standards, and continuous professional development are recommended to strengthen technical competency among agro-dealers.

Keywords: Agro-dealer; Pesticide; Technical Competency; Customer Retention; Business Growth

INTRODUCTION

Business growth is a central measure of enterprise performance, reflected through increased sales, customer retention, market expansion, and profitability. In the pesticide agro-dealer sector, growth is increasingly dependent on the ability of firms to provide value beyond product sales through technical advisory services. Technical competency, the ability to apply specialised knowledge and skills effectively (Magomedov et al., 2022), is a critical driver of this growth. Agro-dealers with strong technical competency provide accurate guidance on pesticide selection, dosage, application, and safety, thereby enhancing customer satisfaction and trust, which translates into repeat purchases and long-term business relationships (Khan et al., 2022). In

agriculture, where productivity relies heavily on knowledge and innovation, agro-dealers serve as key intermediaries between suppliers and farmers, making technical competency not only a professional requirement but a strategic factor influencing enterprise performance (Aregaw et al., 2023; Charatsari et al., 2024).

Globally, agriculture employs approximately 916 million people, accounting for about 26.1% of total employment (FAO, 2025). Pest outbreaks cause 20–40% crop losses annually, increasing dependence on pesticides, and the global pesticide market now exceeds USD 80 billion (FAO, 2022). These trends highlight the growing importance of agro-dealers in supporting agricultural productivity. In Sub-Saharan Africa, agriculture accounts for about 60% of employment, with agro-dealers supplying inputs to nearly 70% of smallholder farmers (World Bank, 2025; AGRA, 2019). Given under-resourced public extension systems, agro-dealers have become primary sources of technical advice, making their competency essential for sustaining business growth.

In neighbouring countries such as Malawi, Tanzania, and Zimbabwe, studies indicate that training and technical capacity building among agro-dealers improve advisory services, leading to better farm outcomes and stronger business performance (Poonia et al., 2021). In Zambia, agriculture employs about 70% of the population, and the agro-dealer network has expanded under agricultural reforms and input support programmes (AGRA, 2019). Technically competent agro-dealers enhance farmer yields, customer satisfaction, and sales performance, thereby driving business growth (Masunungure, 2022; Tambo et al., 2024). Despite this, limited empirical evidence directly links technical competency to measurable business growth among agro-dealers, particularly in Lusaka.

In an ideal agricultural input market, pesticide agro-dealers function as trusted advisors who enhance farmer productivity, ensure regulatory compliance, and drive business growth through customer trust and market expansion (Bwibo, 2025; Bamigboye et al., 2024). However, in Lusaka, many agro-dealers lack adequate knowledge and skills to provide comprehensive advisory services, partly due to limited training and access to updated information (Mwanza and Chishimba, 2024). This technical inadequacy means some agro-dealers operate primarily as product sellers with minimal advisory capacity (Gunashree, 2023), exposing farmers to incorrect recommendations, ineffective pest control, and associated health and environmental risks. Poor advisory services further erode customer trust and retention, ultimately constraining business performance (George, 2025; Kandepu and Bwalya, 2025). This study therefore aimed to assess the impact of technical competency on business growth among pesticide agro-dealers in Lusaka, Zambia.

Objectives of the Study

The purpose of this study was to assess the impact of technical competency on business growth among pesticide Agro dealers in Lusaka, Zambia.

1. To establish the extent to which product knowledge and expertise of pesticide Agro dealers in Lusaka contribute to business growth.
2. To examine the level of product advisory services and its influence on sales growth and customer retention among pesticide Agro dealers in Lusaka.
3. To evaluate the relationship between technical competency and customer satisfaction among pesticide Agro dealers in Lusaka.

Significance of the Study

The study was significant because it highlighted how technical competency among pesticide Agro dealers in Lusaka directly influenced business growth and agricultural sustainability. From a business and agriculture industry perspective, the findings underscored that product knowledge, advisory services, and customer satisfaction were critical drivers of sales growth, retention, and improved farming outcomes. In terms of policy intervention, the study provided evidence to guide government and regulatory bodies in designing training programs and certification standards that enhanced dealer expertise, thereby ensuring safer and more effective

pesticide use. Regarding academic contribution, the research added to the body of knowledge on agribusiness development, offering empirical insights into the link between technical competency and business performance in Zambia's agricultural sector.

Scope and Limitations

This study investigated pesticide agro-dealers in Lusaka District, Zambia, focusing on their technical competency, which encompasses product knowledge, expertise in pesticide selection, and advisory capabilities for safe application. It assessed how these competencies influenced business growth, sales growth, customer retention, and customer satisfaction. The study targeted registered small and medium-scale dealers within Lusaka, excluding those dealing exclusively in non-pesticide inputs. The study was limited to practices and performance indicators over the last three years to align with current market and regulatory conditions. It is further acknowledged that self-reported data may be subject to social desirability bias, and findings may not be generalisable beyond formally registered agro-dealers in Lusaka.

LITERATURE REVIEW

Conceptual Framework

The conceptual framework served as a guiding structure to connect technical competency with business growth among pesticide agro-dealers in Lusaka. It sought to establish whether technical competency directly influences business growth, with or without business management skills as a mediating variable. Product knowledge, expertise, and advisory services formed the foundation of technical competency, which translated into sales growth, customer retention, and customer satisfaction. By mapping these relationships, the framework allowed the study to systematically address each research objective and ensured that findings were aligned with the theoretical underpinnings of business growth.

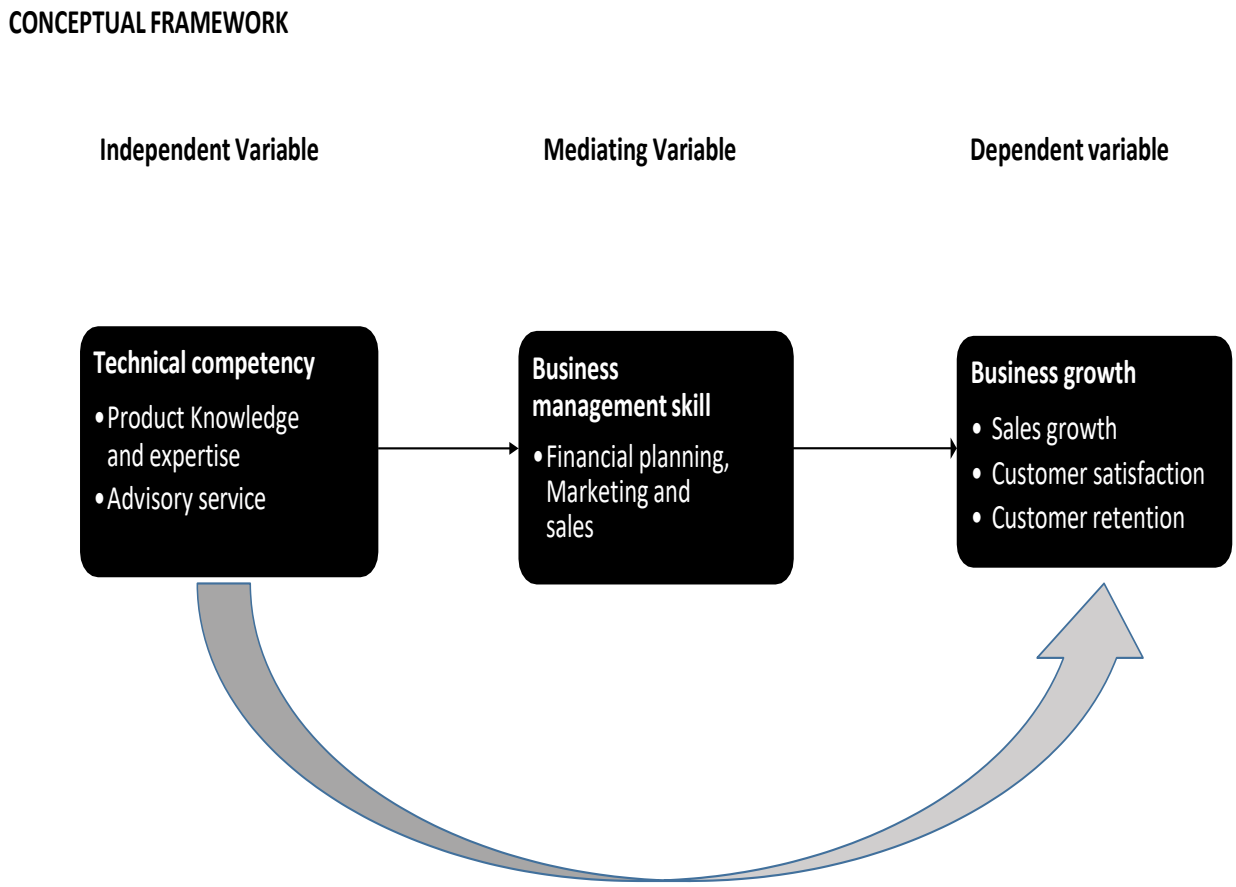


Figure 1: Conceptual Framework

THEORETICAL FRAMEWORKS

This employed a multi-theoretical approach to comprehensively assess the impact of technical competency on business growth. Two complementary frameworks the Resource-Based View (RBV) and Human Capital Theory (HCT) explained how agro-dealers' unique technical skills acted as strategic resources, and how knowledge investments drove growth, customer satisfaction, and competitive advantage.

The Resource-Based View (RBV) theory: The RBV is a strategic management framework emphasising a firm's internal resources as sources of competitive advantage, particularly those that are valuable, rare, inimitable, and non-substitutable (VRIN) (Kero and Bogale, 2023; Lee et al., 2023). For this study, RBV illustrated how superior technical competency, as an intangible internal capability, enabled agro-dealers to better meet customer needs, build trust, and differentiate themselves in the market, thereby driving long-term business success.

Human Capital Theory (HCT): Rooted in economics and sociology, HCT considers education, training, and skills as investments that enhance productivity and economic returns (Edeji, 2024; Zhang et al., 2023). Formalised by scholars such as Theodore Schultz and Gary Becker, the theory posits that investments in human capabilities including pesticide knowledge, advisory skills, and professional training directly translate into improved performance. Applied to this study, HCT highlighted the role of agro-dealer competency as critical human capital that, when developed through training and experience, enhanced business viability and customer outcomes.

EMPIRICAL REVIEW

Product Knowledge, Expertise, and Business Growth

Faiz (2025) found that while many retailers in developing countries were aware of biopesticides and integrated pest management (IPM), limited technical knowledge constrained promotion. Training improved confidence, enabling dealers to recommend safer, higher-margin products that supported growth. Similarly, Ken Research (2025) reported that in North America, expertise in herbicide resistance and pest control strategies enhanced farmer retention and boosted sales. The FAO (2018) emphasized that in EU markets, advisory competence and updated product knowledge were critical for competitiveness under strict regulations.

In Uganda, Staudacher et al. (2021) showed pesticides dominated profitability, yet many dealers lacked label and safety knowledge. Certified dealers-built trust and safeguarded turnover. In Kenya, Ogutu et al. (2022) found training increased confidence in promoting biopesticides, diversifying product mixes and margins. Osei & Osei-Akoto (2017) in Niger demonstrated that training improved adoption of improved inputs, with certification later strengthening supplier ties and customer trust. In Zambia, Kandepu & Bwalya (2025) revealed agro-dealers as the sole input source for smallholders, but 73% showed limited knowledge and 68% of farmers were dissatisfied. Gender disparities also shaped access. Regression analysis linked dealer visits to transport, experience, and income. Finally, Munalula & Mungule (2021) found training and skill upgrading sustained businesses in Chipata and Petauke. Dealers investing in technical competence and stronger linkages improved service quality, retained farmers, and enhanced viability, underscoring product knowledge as a key driver of growth.

Advisory Services, Sales Growth, and Customer Retention

Purdue Extension (2025) emphasized that technical advice, problem-solving support, and follow-up services are central to agricultural retailers' ability to differentiate themselves, secure repeat business, and build long-term loyalty. Agro-companies are increasingly positioned as solution providers, offering agronomic guidance and decision-support tools alongside crop protection products, with business models built on improving farm outcomes to sustain relationships and drive growth. Similarly, the FAO (2023) study on Arab countries revealed advisory systems were pluralistic but weak in agribusiness and market access, limiting their contribution to farmer outcomes. Strengthening advisory functions was seen as critical for sustainable value chains.

In Kenya, Baumüller (2015) highlighted mobile services like M-Farm, which improved production decisions and income, with radio supporting price dissemination in early stages. In Malawi, AFAP (2025) found over 90% of agro-dealers prioritized chemicals, seeds, and fertilizers, with technical advice driving sales growth. Bundled demonstrations and credit options enhanced retention, though training gaps remained. In Zambia, Burrows et al. (2017) reviewed nine organizational models, highlighting iDE's Farm Business Advisors who provided agronomic advice, financial literacy, and input access, building strong farmer relationships. Scaling potential was linked to hybrid incentives blending revenue with impact. Conversely, Schwarze (2021) identified regulatory gaps, low dealer qualifications (49%), hawking tactics (29%), and counterfeiting (24%) as major issues. These eroded trust and retention, fostering adverse selection and unsustainable growth, compounded by weak enforcement and limited training.

Technical Competency and Customer Satisfaction

Mathuabirami et al. (2024), using the SERVQUAL framework, found empathy, reliability, responsiveness, and tangible service aspects significantly influenced satisfaction, positioning service quality as a strategic marketing tool. Similarly, Nathan & Van Leuven (2022) emphasized technical competency knowledge of formulations, soil compatibility, and application rates as foundational for trust and repeat patronage. Training in product specifications and pest diagnostics was recommended to differentiate shops and improve yields. At a broader scale, the World Bank (2025) reported certified agro-dealers in Brazil and Colombia achieved 20–30% higher retention, with trained networks serving 1.6 million smallholders and increasing incomes by 22%. Competence in biological inputs mirrored sustainability trends, though SERVQUAL-style surveys were recommended to measure satisfaction. In contrast, AFAP (2023) found Mozambican dealers struggled with technological integration, limiting inventory management and customer outreach, which hindered growth.

Customer focus also emerged as critical. Micheni & Muchemi (2019) showed customer-centric strategies improved performance of agricultural firms in Nairobi, recommending prompt complaint handling. Reinforcing this, AGRA (2023) reported agro-dealers supported by extension workers and village-based advisors played substantial roles in transformation across 11 African countries, though inconsistent training limited long-term support. In Zambia, the Musika/ZEMA intervention (2015–2021) trained over 350 agro-dealers in safe pesticide use, storage, and labeling compliance. Certification harmonized by CropLife Zambia reduced misuse risks, improved trust, and achieved satisfaction rates above 70%. Later integration of digital tools for stock traceability further enhanced loyalty and input access in rural Copperbelt areas.

METHODOLOGY

Research Design

The study employed an explanatory sequential mixed-methods design to assess how technical competency influenced business growth among pesticide agro-dealers in Lusaka. In the first phase, quantitative data were collected to establish measurable patterns and relationships between levels of technical competency and indicators of business growth including customer retention, sales performance, and market expansion. In the second phase, qualitative methods deepened the understanding of these findings by capturing the lived experiences, perceptions, and challenges faced by agro-dealers and farmers. Integrating both approaches sequentially produced a richer, empirically grounded, and contextually meaningful assessment. This design was particularly suitable because the issue of technical inadequacy required both numerical evidence to demonstrate its impact and narrative accounts to uncover underlying causes, training gaps, and practical implications.

Data Collection Methods

Structured questionnaires measured pesticide identification, storage, application techniques, and growth indicators such as revenue and customer retention using five-point Likert scales. Questionnaires were available in both hard copy and digital formats. The principal investigator explained procedures and collected responses on-site or via follow-up visits. In-depth interviews were scheduled at participants' convenience, conducted in

person or remotely, with informed consent obtained prior to each session. Sessions lasted 15–30 minutes, were audio-recorded, and subsequently transcribed. This dual-mode approach ensured ethical compliance, high participant engagement, and robust data quality.

Target Population and Sampling

The study population comprised 720 pesticide agro-dealers formally registered under the Zambia Integrated Agricultural Management Information System (ZIAMIS) and approved through the Farmer Input Support Programme (FISP). Using Yamane's (1967) formula at a 95% confidence level and a 5% margin of error, a minimum sample size of 257 participants was determined. Stratified random sampling was applied across small, medium, and large business strata to ensure proportional representation and reduce sampling bias. A total of 235 questionnaires were correctly completed and returned, yielding a response rate of 91.4%, which is considered statistically adequate. Purposive sampling subsequently identified 30 participants for in-depth interviews using maximum variation, selecting 15 high-competency dealers with relatively low growth and 15 high-growth dealers with moderate competency. Saturation was reached after 30 interviews.

Data Analysis Techniques

Quantitative data from agro-dealer questionnaires were analyzed in SPSS 27 using descriptive statistics to profile business scale, competency scores, and growth variability. Pearson correlation revealed a significant positive link between technical competency and business growth, while regression explained variance in growth outcomes. Qualitative data underwent thematic analysis in NVivo 12, with interviews transcribed, coded, and categorized around product knowledge, advisory services, and customer satisfaction. Recurring themes highlighted technical expertise as central to sales growth and retention, reinforcing statistical findings through triangulated evidence for comprehensive understanding.

Validity and Reliability

Instrument validity was established through multiple complementary approaches. Content validity was achieved by subjecting the questionnaire to expert review from three pesticide specialists and two agroeconomists, whose feedback confirmed comprehensive coverage of pesticide handling, advisory services, and business growth metrics. Construct validity was examined using exploratory factor analysis (EFA), with competency items loading onto three distinct factors knowledge, application, and safety that together explained a substantial proportion of variance. Criterion validity was demonstrated by correlating survey scores with external business records such as monthly sales and customer retention figures, with significant correlations confirming the instrument's predictive validity. For qualitative data, member checking and cross-method triangulation enhanced overall validity.

Reliability was assessed through Cronbach's alpha, test–retest reliability, and intercoder agreement. As shown in Table 1, Cronbach's alpha coefficients ranged from $\alpha = 0.78$ to $\alpha = 0.85$, exceeding the commonly accepted threshold of 0.70 and confirming adequate internal consistency across all constructs. Test–retest reliability, assessed by readministering the questionnaire to 30 participants after two weeks, yielded an intraclass correlation coefficient of $r = 0.89$, indicating excellent temporal stability. For qualitative data, two independent coders achieved 92% intercoder agreement in NVivo 12, with discrepancies resolved through discussion.

Table 1: Reliability Analysis

Construct / Section	Items Used	Cronbach's Alpha	Interpretation
Product Knowledge & Expertise	Identification of correct pesticide, knowledge of active ingredients, safety precautions, convincing farmers, stocking variety	α =0.78	Good internal consistency. Items reliably measure technical competency.

Advisory Services	Advising on dosage, pre-harvest intervals, safety precautions, repeat customers, willingness to pay higher prices.	α =0.82	Good reliability. Advisory service items consistently measure customer-focused guidance.
Customer Retention & Sales Growth	Return customers, refusal to buy elsewhere, increase in monthly sales.	α =0.80	Acceptable to good reliability. Items align well but show moderate variation due to price competition.
Overall Questionnaire	All Likert-scale items combined across sections	α =0.85	Very good reliability. The questionnaire consistently measures the broader construct of technical competency and its impact on business growth.

Data Analysis

Quantitative data were analysed in SPSS v27 using descriptive statistics to profile business scale, competency scores, and growth variability. Pearson correlation revealed a significant positive association between technical competency and business growth, while multiple regression analysis quantified the variance in business growth outcomes explained by competency factors. Qualitative data underwent thematic analysis in NVivo 12, with interviews transcribed, coded, and categorised around product knowledge, advisory services, and customer satisfaction. Recurring themes reinforced statistical findings through triangulated evidence, producing a comprehensive and nuanced understanding of the research problem.

RESULTS AND DISCUSSIONS

Results

Profile of the Respondents

Table 2: Profile of Respondents (n =235)

Variable	Attribute	Frequency	Percentage
Gender	Male	153	65.1%
	Female	82	34.9%
	Total	**235**	**100.0%**
Highest level of education	No formal education	0	0.0%
	Primary School	0	0.0%
	Secondary School	20	8.5%
	Certificate/ Diploma	112	47.7%
	Bachelor's Degree or higher	103	43.8%
	Total	**235**	**100.0%**
Duration of being an agro-dealer	Less than 1 year	15	6.4%
	1-3 years	48	20.4%
	4-7 years	82	34.9%
	8 years+	90	38.3%
	Total	**235**	**100.0%**
Location of the agro-shop	Low-densely populated area	50	21.3%
	Medium-densely populated area	75	31.9%
	High-densely populated area	110	46.8%
	Total	**235**	**100.0%**

Number of employees in the agro-shop	Less than 5	82	34.9%
	5-10	103	43.8%
	10+	50	21.3%
	Total	235	100.0%
Membership to Crop Life Zambia	Yes	79	33.6%
	No	95	40.4%
	In the process	61	26.0
	Total	**235**	**100.0%**

As shown in Table 2, 153 respondents (65.1%) were male and 82 (34.9%) were female, accurately reflecting the gender distribution within the sampled population of 235. The majority held a Certificate or Diploma (47.7%) or a Bachelor's degree or higher (43.8%), suggesting a relatively well-educated dealer population. In terms of experience, 38.3% had operated for over eight years, indicating a predominantly experienced cohort. Nearly half (46.8%) were located in high-density areas, with 33.6% affiliated with CropLife Zambia. These demographic characteristics provide important context for interpreting findings on technical competency and business growth.

Descriptive Analysis of Product Knowledge and Expertise of Pesticide Agro-Dealers and Business Growth

Descriptive analysis revealed that product knowledge and expertise among Lusaka pesticide agro-dealers positively influenced business growth, though with varying strength across items. Correct pesticide identification for specific pests and diseases enhanced trust and sales (mean = 3.49, SD = 1.23). Knowledge of active ingredients registered the lowest mean (3.31), revealing gaps in deeper advisory capacity. Ability to explain safety precautions scored 3.33, with credible dealers perceived as more reliable. Product knowledge also attracted customers over competitors (mean = 3.47). Stocking specialised pesticides recorded the highest mean (3.51), demonstrating that technical competency expanded product offerings and boosted sales, underscoring its role as a competitive advantage. Table 3 presents the detailed descriptive statistics.

Table 3: Descriptive Analysis of Product Knowledge and Expertise (n=235)

Statement	N	Mean	Std. Dev.	Frequencies (1–5)	Interpretation
Identify correct pesticide for a specific pest/disease	235	3.49	1.23	1=19 (8.1%), 2=28 (11.9%), 3=62 (26.4%), 4=68 (28.9%), 5=58 (24.7%)	Majority agreed this skill is vital, showing that accurate identification builds trust and drives sales.
Knowledge of active ingredients & how they work	235	3.31	1.23	1=22 (9.4%), 2=40 (17.0%), 3=75 (31.9%), 4=40 (17.0%), 5=58 (24.7%)	Lower mean suggests gaps in deeper technical knowledge, which may limit advisory effectiveness.
Understand & explain safety precautions	235	3.33	1.39	1=40 (17.0%), 2=22 (9.4%), 3=58 (24.7%), 4=40 (17.0%), 5=75 (31.9%)	Mixed responses, but strong agreement highlights that safety guidance enhances credibility and customer confidence.

Product knowledge helps convince farmers to buy from my shop	235	3.47	1.34	1=28 (11.9%), 2=32 (13.6%), 3=47 (20.0%), 4=58 (24.7%), 5=70 (29.8%)	High agreement shows knowledge is a competitive advantage, directly influencing customer choice.
Expertise allows stocking wider variety of specialized pesticides (sales)	235	3.51	1.34	1=32 (13.6%), 2=28 (11.9%), 3=51 (21.7%), 4=57 (24.3%), 5=67 (28.5%)	Highest mean indicates expertise expands product range, boosting sales and business growth.

Cross-Tabulation of Advisory Services and Customer Return Rates

The cross-tabulation in Table 4 illustrates the relationship between the frequency of dosage advisory services and customer return rates. Agro-dealers who always provided dosage advice reported substantially higher customer return rates, with 44% recording a 76–100% return rate compared to only 17% among those who never provided such advice. These findings confirmed a positive association between consistent advisory service provision and customer retention, supporting the study's second research objective.

Table 4: Cross-Tabulation of Advisory Service Frequency and Customer Return Rate

Advisory Service (Dosage Advice)	**Customer Return Rate (0–25%)**	**26–50%**	**51–75%**	**76–100%**	**Total**
Never	12 (21%)	20 (35%)	15 (27%)	10 (17%)	57
Sometimes	8 (12%)	15 (23%)	25 (38%)	18 (27%)	66
Always	5 (6%)	8 (11%)	28 (39%)	30 (44%)	71
Total	25	43	68	58	194

Dealer characteristics including education level, years of experience, business location, and institutional affiliation further moderated technical competency outcomes. Dealers with bachelor's degrees or higher (43.8%) and those with over eight years of experience (38.3%) demonstrated stronger product knowledge and advisory skills. Membership in CropLife Zambia (33.6%) and possession of valid ZEMA licences (57.4%) were also positively associated with better advisory practices and regulatory compliance.

Regression Analysis: Technical Competency and Customer Satisfaction

Multiple regression analysis confirmed that technical competency significantly influenced business growth and customer satisfaction among pesticide agro-dealers. The overall model was statistically significant ($F = 47.3$, $p < 0.001$), with an $R^2 = 0.62$, indicating that 62% of the variation in business growth outcomes was explained by the competency factors. Advisory services were the strongest predictor of customer satisfaction ($\beta = 0.31$, $p < 0.001$), followed by knowledge of active ingredients ($\beta = 0.25$) and pesticide knowledge ($\beta = 0.28$). Table 5 presents the full regression results.

Table 5: Regression Results- Technical Competency Predictors of Customer Satisfaction

Predictor (Technical Competency Indicators)	Coefficient (β)	Std. Error	t-value	Interpretation
Knowledge of pesticides	0.28	0.07	4.00	Strong positive effect; knowledge increases satisfaction.
Formal training	0.22	0.06	3.67	Significant; trained dealers provide better customer experiences.
Reading labels	0.19	0.05	3.80	Significant; careful label use improves satisfaction.
Identify active ingredients	0.25	0.06	4.10	Strong predictor; expertise builds trust.
Advisory services (dosage, safety, pre-harvest)	0.31	0.08	3.88	Most influential; advisory services directly enhance satisfaction.

Product knowledge also demonstrated a significant positive effect on sales growth (B = 0.42, p = 0.001), while advisory services similarly predicted customer retention (B = 0.37, p = 0.003). These findings demonstrate that product knowledge, advisory services, and customer satisfaction collectively constitute critical drivers of agro-dealer performance and sustainability.

Qualitative Themes

Qualitative themes illustrated how product knowledge and technical expertise shaped business outcomes. Farmers consistently valued detailed guidance, which built trust, differentiated shops from competitors, and drove repeat purchases. Expertise not only boosted sales but also enhanced credibility, generating referrals and customer loyalty. However, challenges including counterfeit product competition and literacy barriers among some farmers limited the full realisation of advisory benefits.

"My knowledge of pesticide products builds customer trust because when farmers come asking about best sprays for fall armyworm on maize, I explain mixing ratios and safety times in detail…" **(Agro-Dealer#3, 02/03/2026).**

"Last planting season, a farmer had persistent cutworm issues; I recommended the right product at precise rates, and his maize thrived. He bought more for his whole field and told his neighbours." **(Agro-Dealer#28, 12/03/2026).**

Advisory service themes further highlighted how guidance-built loyalty, drove repeat purchases, and differentiated agro-dealers from competitors. Farmers valued tailored recommendations that considered crop type, soil conditions, and budget constraints, perceiving such advice as honest and reliable. Despite challenges including time constraints, limited access to updated information, and credit issues, advisory services consistently enhanced customer trust, retention, and business growth.

"When I take time to advise farmers on which pesticide to use, how to mix, and when to spray, they start trusting me more than other shops." **(Agro-Dealer#1, 02/03/2026).**

"A farmer once came with serious aphid problems in his beans; I explained the right product, mixing rate, and spraying interval. After seeing good results, he returned within two weeks to buy more for his other field and later brought his brother." **(Agro-Dealer#24, 09/03/2026).**

Themes on technical competency and customer satisfaction revealed that accurate diagnosis, clear safety explanations, and effective problem-solving improved farmer confidence and trust. Customers expressed

appreciation through referrals, repeat purchases, and gifts, viewing agro-dealers as partners rather than mere sellers. However, gaps in advanced pest diagnosis, resistance management, and communication with low-literacy farmers sometimes reduced satisfaction, highlighting the need for continuous training and improved advisory systems.

"My technical competency affects customer satisfaction because when a farmer comes with a sample of damaged leaves, I can quickly identify the pest and recommend the right pesticide and dosage." **(Agro-Dealer#18, 06/03/2026).**

"Customers express satisfaction by coming back to thank me in person, sometimes even bringing a small bag of maize or vegetables to show the harvest." **(Agro-Dealer#21, 09/03/2026).**

DISCUSSION

Product Knowledge, Expertise and Business Growth

The study found that 48.9% (n = 115) of agro-dealers were adequately knowledgeable about pesticides, and 70.2% (n = 165) had received formal training. Advisory services were frequent: 40.4% (n = 95) advised 11–30 farmers monthly and 24.3% (n = 57) advised over 50. Agreement ratings confirmed that 52.8% (n = 124) believed stocking specialised pesticides increased sales, and 54.5% (n = 128) agreed that product knowledge helped attract customers over competitors. Qualitative evidence reinforced that expertise-built trust, boosted referrals, and differentiated businesses, though counterfeit competition and literacy barriers limited impact in some cases.

From the perspective of Human Capital Theory, these findings illustrate knowledge as productive human capital. The finding that 70.2% of dealers had formal training, and that product knowledge (mean = 3.49) and advisory services ($\beta = 0.31$, $p < 0.001$) significantly predicted customer satisfaction, confirms that investment in technical competency directly translates into higher sales and business sustainability. These results align with Faiz (2025), Staudacher et al. (2021), and Munalula and Mungule (2021), who similarly found that training-enhanced competency strengthened dealer credibility, customer satisfaction, and business performance. Furthermore, using the RBV, product knowledge and advisory expertise functioned as valuable, inimitable resources: 54% (n = 126) agreed that correct pesticide identification contributed to growth, while expertise in stocking specialised pesticides (52.8%) created loyalty networks that competitors could not easily replicate.

Advisory Services, Sales Growth, and Customer Retention

The study established that advisory services were widely practised among Lusaka pesticide agro-dealers. For instance, 47.6% (n = 112) always advised farmers on correct dosage, and 53.3% (n = 118) consistently explained pre-harvest intervals. Advisory services influenced customer retention, with 32.3% (n = 76) reporting significant increases in returning customers. Sales growth was also positively affected, as 54.5% (n = 127) agreed that trust in recommendations boosted monthly volumes. Interview data reinforced that tailored advice-built loyalty, generated referrals, and enabled bulk orders.

These findings resonate with Purdue Extension (2025) and AFAP (2025), which highlighted that bundling technical advice with sales enhanced farmer retention and revenue. From the HCT perspective, advisory skills as human capital improved customer trust, retention, and sales growth—confirming that knowledge investment directly translates into improved dealer performance.

From the RBV, advisory services functioned as inimitable resources: dealers providing tailored guidance differentiated themselves in ways competitors could not easily replicate, thereby securing sustained competitive advantage. These results partially contrast with Schwarze (2021) and Kandepu and Bwalya (2025), where regulatory gaps and dealer knowledge deficiencies undermined trust in other Zambian contexts, further underscoring the strategic value of advisory competency in Lusaka.

Technical Competency and Customer Satisfaction

The study revealed that 42.1% (n = 99) of agro-dealers reported customer complaints about pesticides not working, largely attributable to wrong dosage (100%), pest resistance (40.4%), counterfeit products (28.3%), or incorrect recommendations (15.2%). Despite these challenges, 44.7% (n = 105) frequently received compliments for solving pest problems, and 44.7% (n = 105) regularly gained new customers through referrals. Trust levels were moderate, with 32.3% (n = 76) confirming customers trusted their advice more than competitors. Importantly, 61.7% (n = 145) agreed that technical competency enhanced satisfaction, loyalty, and referrals. Over two years, 70.2% (n = 165) reported customer base growth, 58.7% (n = 138) increased monthly sales, and 57% (n = 134) expanded their businesses.

From the HCT perspective, these outcomes illustrate how technical competency acquired through training and experience functions as productive human capital that directly enhances customer satisfaction and business viability. Using the RBV, technical expertise—particularly in pest diagnosis and tailored advisory services—acted as a strategic resource that differentiated dealers from competitors and generated sustained loyalty networks. These findings align with Mathuabirami et al. (2024), Nathan and Van Leuven (2022), and the World Bank (2025), which collectively affirm that service quality, technical knowledge, and advisory capacity are central to customer satisfaction and retention in agro-dealer markets.

Alignment with and Departure from Regional Evidence

The study's findings broadly align with regional evidence emphasising the role of technical competency and advisory services in agro-dealer success. Faiz (2025) and Purdue Extension (2025) highlighted that training and advisory support increased dealer confidence, customer trust, and loyalty. AFAP (2025) in Malawi found that bundling technical advice with sales boosted farmer retention and revenue. Burrows et al. (2017) in Zambia confirmed that agronomic advice and tailored recommendations strengthened farmer relationships and sustainable growth. Conversely, the study's findings diverged from Kandepu and Bwalya (2025), who reported widespread knowledge deficiencies among Central Zambian dealers, with 73% demonstrating limited knowledge and 68% of farmers dissatisfied. Unlike these contexts, Lusaka agro-dealers demonstrated stronger competency outcomes, building loyalty, referrals, and business expansion despite notable challenges.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The study concluded that technical competency encompassing product knowledge, advisory services, and diagnostic skills was central to agro-dealer performance in Lusaka. Nearly half (48.9%) of dealers demonstrated adequate knowledge, with 70.2% trained, and 52.8% agreeing that stocking specialised pesticides contributed to business growth. Advisory services proved vital: 47.6% always advised on dosage, 53.3% on pre-harvest intervals, and 32.3% reported significant increases in returning customers. Customer satisfaction was strongly linked to competency, with 61.7% agreeing it enhanced loyalty and referrals, while 70.2% reported customer base growth and 58.7% increased sales. Regression analysis confirmed that advisory services were the strongest predictor of customer satisfaction ($\beta = 0.31$, $p < 0.001$), with the overall model explaining 62% of variance in growth outcomes ($R^2 = 0.62$). Despite challenges such as literacy barriers, counterfeit products, and resistance management gaps, technical competency remained the foundation of customer trust, retention, and sustainable business expansion.

Recommendations

1. ZEMA and government should mandate certified agro-dealer training, enforce anti-counterfeit surveillance, and fund multilingual advisory guides for farmers.
2. Agrochemical companies should fund dealer capacity-building in advisory skills, pest diagnosis, and resistance management, rewarding excellence through structured incentive schemes.

3. Training institutions should embed agro-dealer advisory and business skills into curricula and offer regular CropLife Zambia and ZEMA refresher courses.
4. Agro-dealers should pursue continuous training, maintain professional memberships, and track customer interactions to strengthen advisory services and build lasting farmer relationships.

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