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(CASE REPORT)

EXPLORING THE EFFECTS OF ENTREPRENEURSHIP TRAINING ON SME GROWTH: A CASE STUDY OF METAL FABRICATION APPRENTICESHIPS ALONG KATIMA MULILO ROAD, LUSAKA, ZAMBIA

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ABSTRACT

Effective identification and mitigation of factors affecting small and medium enterprise (SME) growth is critical for economic development and employment of youth in urban informal economies. The study investigated the impact of entrepreneurship training on SME growth in informal metal fabrication apprenticeships along Katima Mulilo Road in Lusaka, Zambia. The specific objectives were to examine the effect of training on financial literacy, investigate the impact of training on business management practices, identify barriers and enablers to training application and examine the moderating role of demographic factors. A mixed-methods case study design was employed with a purposively sampled 70 youth-led SME operators. Data were collected through semi-structured questionnaires and interviews and analysed using descriptive statistics, chi-square tests, and thematic analysis. Results show a strong positive association between entrepreneurship training and financial literacy: trained respondents were significantly more likely to budget, track expenses, and reinvest profits ($p < .001$). Training also boosted business management practices such as costing, inventory control and client engagement. The main barriers to implementing training were capital constraints (60.0%), gaps in mentorship (25.7%) and limited market access (14.3%) while peer support (54.3%) and access to tools and workspace (50.0%) were the strongest enablers. Age, education and business experience significantly moderated application training ($p <.05$). The study concludes that a comprehensive entrepreneurship training program, sensitive to the context and providing enabling resources such as access to capital and mentorship, can significantly improve the operational and financial capabilities of informal metal fabrication SMEs in Zambia

Keywords: Entrepreneurship Training; SME Growth; Financial Literacy; Business Management; Informal Metal Fabrication; Youth Entrepreneurship; Zambia

1 INTRODUCTION

1.1 Background of the Study

Micro, small and medium enterprises (MSMEs) are widely recognized as engines of employment and economic transformation in developing economies. Zambia's informal sector is no exception. In Lusaka, along the Katima Mulilo Road, is a dense concentration of youth-led metal fabrication workshops. They are based on informal apprenticeships

rather than formal technical education. These apprenticeships are good at passing on fabrication skills, but often leave graduates without the financial literacy and management competencies to convert technical skill into sustained business growth [1], [2].

Globally, entrepreneurship training has been proposed as a way of addressing this gap. Human Capital Theory posits that investment in skills and knowledge will enhance individual productivity, and hence enterprise performance [3]. Further, Social Learning Theory suggests that youth entrepreneurs acquire much of their business behavior by observing mentors and peers in an apprenticeship context [4]. The Resource-Based View (RBV) conceptualizes managerial competencies such as costing, inventory control and client engagement as internal capabilities that yield competitive advantage for the firm [5].

Despite increased policy attention to youth entrepreneurship in Zambia, there is limited empirical evidence on how entrepreneurship training translates into measurable changes in financial literacy and business management practice among informal metal fabrication apprentices, and on which demographic and structural factors moderate this translation. The present study addresses this gap.

The metal fabrication trade along Katima Mulilo Road is a particularly instructive case as it includes two features common across Zambia's urban informal economy but rarely studied in tandem: a strong, technically competent apprenticeship pipeline, and chronic under-capitalization of the resulting enterprises. Workshops in this corridor tend to start as welding or fabrication stalls run by one operator and become successful through informal apprenticeship when demand grows, and plateau – rarely evolving into registered, tax-compliant, growth-oriented businesses. It is therefore directly relevant to both individual operators and national policy instruments such as the Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) and the Ministry of Small and Medium Enterprise Development (MSMED), both of which are actively seeking evidence-based models for scaling informal sector support, to understand whether and under what conditions entrepreneurship training can help break this plateau.

1.2 Problem Statement

Years of technical apprenticeship notwithstanding, weak financial record-keeping, inconsistent costing and limited reinvestment are still visible among youth-led SMEs along Katima Mulilo Road. Where entrepreneurship training has been offered, its uptake and practical application remain uneven, and the specific barriers and enablers that determine whether training is translated into practice are not well documented for this sector. Without this understanding, training providers and policymakers risk designing interventions that are technically sound but poorly matched to the lived constraints of informal operators.

Objectives of the Study

The study was guided by four objectives: (i) to assess the influence of entrepreneurship training on financial literacy; (ii) to examine its impact on business management practices; (iii) to identify the barriers and enablers affecting training application; and (iv) to investigate the moderating role of demographic factors age, education, gender, and business experience on training effectiveness.

2 STUDY AREA AND POLICY CONTEXT

There are several corridor markets in Lusaka, and the informal manufacturing activity in the Katima Mulilo Road corridor has grown organically around access to arterial traffic, suppliers of raw materials, and shared welding and fabrication infrastructure. Operators in this corridor typically produce window and door frames, gates, furniture and light structural steelwork for residential and small commercial clients. The trade is more location-specific than mobile trading businesses. Metal fabrication takes longer to learn, involves more capital equipment (welding sets, angle grinders, cutting tools) and requires a bigger workshop footprint than Zambia's more visible trading and vending sectors, making entry and exit slower.

The informal sector is the major source of urban employment in Zambia and MSME development has been identified as a priority pillar for economic diversification away from copper dependence in successive national development plans. Institutions such as TEVETA and MSMED have mandates that overlap directly with the population studied here: through TEVETA's oversight of the standards for technical and vocational training, and MSMED's mandate to support SME growth and formalization. However, in practice, coordination between technical-skills regulation and commercial-skills support is limited, especially for informal, unregistered operators such as those along Katima Mulilo Road. The recommendations of the present study (Section IX) are framed to be read against this policy landscape: they are intended to be actionable within existing institutional mandates, rather than requiring new agencies or programs.

The enterprises of the corridor also exemplify a more general structural characteristic of the urban informal economy in Zambia: the coexistence of strong transmission of technical skills and weak transmission of commercial skills. Apprentices on Katima Mulilo Road spend two to four years under a senior fabricator before they can work on their own. During that time their technical competence in welding, cutting and fabrication is rigorously, if informally, tested by the standards of the trade itself – an apprentice whose joints fail or whose gates do not square up simply does not attract repeat clients. There is no equivalent informal quality-control mechanism for commercial practice: an apprentice can graduate to independent operation without ever having costed a job correctly or separated business from personal income, because such failures are less immediately visible to clients or peers than a structural defect in the metalwork. This asymmetry between mechanisms of technical and commercial accountability provides a plausible structural explanation for the fact that commercial competence is lagging behind technical competence in this sector, a pattern that data from this study (Section VI) will directly substantiate;

3 LITERATURE REVIEW

3.1 Entrepreneurship Training and Business Outcomes

The international evidence on youth entrepreneurship training is mixed, but generally positive. Meta-regressions of entrepreneurship programmes in developing countries, conducted by Cho and Honorati, found consistent, if modest, improvements in business knowledge and survival, with the strongest effects where training was paired with finance or mentorship [10]. Similarly, Bruhn and Zia's randomized evaluation of business training for young entrepreneurs in Bosnia found that trained owners adopted better record keeping and pricing practices, though revenue effects took longer to appear [8]. Following this line of work in Mexico, Bruhn, Karlan and Schoar show that consulting services increased managerial practice scores significantly, and over time, firm productivity [9]. A common theme running through this literature is that behavioral outcomes - what an entrepreneur actually does day to day - change more easily and more quickly than headline outcomes like revenue or employment. This distinction is directly relevant to the interpretation of the present study's own indicators which are predominantly behavioral (budgeting, costing, record-keeping) rather than financial performance measures.

In the African context, Sonnenberg's review of traditional apprenticeship in Ghana and Senegal documented the persistence of informal skills transfer as strong on technical competence but weak on the commercial dimensions of enterprise – the very gap that structured entrepreneurship training seeks to close [2]. The OECD/ILO's synthesis of effective youth entrepreneurship policy also notes that skills training alone is rarely enough; it must be bundled with access to finance, market linkages and mentorship to translate into enterprise growth [11]. This is echoed by Zambian and regional studies. Adams, Johansson de Silva and Razmara note that skills development in the informal sector in Sub-Saharan Africa is often disconnected from financial services and market infrastructure, limiting returns to training [1].

3.2 Human Capital and Social Learning Perspectives on Skill Formation

Two complementary theoretical traditions account for the acquisition and transmission of commercial skill among informal entrepreneurs. Training is seen as an investment in the Human Capital Theory, increasing a person's stock of productive knowledge, with returns coming from better decision making and eventually earnings [3], [6]. This tradition predicts that any exposure to structured training, formal or informal, should lead to an increase in measurable competence. Objective One of this study is a direct test of that prediction. However, the opposite is true for apprenticeship trades where skill acquisition is mostly informal through observing and interacting with more experienced peers and mentors rather than through structured curricula [4]. In practice, both mechanisms operate simultaneously in contexts such as Katima Mulilo Road, where apprentices are exposed to some structured instruction (formal or NGO provided training) while at the same time learning norms and practices from workshop peers. One of the reasons this study measures "training received" broadly to include both formal and informal exposure and not limiting the construct solely to classroom-based instruction.

3.3 Barriers to Applying Training in Informal Economies

A separate but related literature explores why training does not always lead to changed practice—the central concern of the third objective of this study. Across Sub-Saharan Africa, structural barriers, especially access to start-up and working capital, are consistently cited as the binding constraint to translating entrepreneurial knowledge into the growth of enterprises [1], [14]. Where there is no capital, market access, or mentorship, even the best-designed training programmes are unlikely to influence business outcomes, as operators may be aware of what they need to do (to separate business and personal finances, or to invest in inventory) but lack the means to implement this knowledge. This literature motivates the present study design to explicitly measure barriers and enablers along with training exposure itself.

3.4 Demographic Moderators of Training Effectiveness

On the demographic dimension, previous work indicates that training effectiveness varies across learner profiles. Older, more experienced entrepreneurs might have more ingrained practices and find it difficult to modify them, while younger entrepreneurs are generally more receptive to new tools, including digital financial applications [12]. Gendered constraints, especially those associated with mobility and market access, have also been shown to affect the degree to which female entrepreneurs can act on training, even when they are enthusiastic recipients of it [13]. The four objectives of the present study were motivated by these strands of literature: that training generally improves business practice; that its translation into performance is conditional on complementary resources; and demographic moderators merit explicit empirical attention in the Zambian informal metal fabrication context where such evidence has been scarce.

3.5 Comparative Regional Perspectives

The Katima Mulilo Road results in a wider pattern in Africa: regional comparisons. Reviews on university-led and vocational entrepreneurship programmes in Eastern and Southern Africa indicate that programmes that combine classroom instruction with structured mentorship and incubation consistently perform better than stand-alone lecture-based delivery on measures of business survival and revenue growth [15]. This is in line with the finding of the present study that access to peer support and mentorship were the two strongest enablers of training application (Section VI-D), and suggests that the Katima Mulilo Road cluster is not an exception but a representative instance of a broader regional pattern where the social infrastructure around training matters as much as its technical content.

4 THEORETICAL AND CONCEPTUAL FRAMEWORK

The study is based on 3 theories. Training entrepreneurship is seen as an investment that improves the cognitive and technical skills of the trainees and leads to better productivity and income prospects [6] within the framework of Human Capital Theory [3]. From this perspective, the financial-literacy improvements documented in Section VI-B are the expected return on a training "investment" in cognitive skill. Social Learning Theory [4] describes the informal transmission of business behavior by observation, modeling, and peer reinforcement, which is particularly relevant in apprenticeship-based trades where much of day-to-day learning is done by watching a master craftsperson or a peer rather than by formal instruction. The Resource-Based View [5], [7] conceptualizes managerial know-how—costing, inventory systems, and customer relationships—as intangible resources that are difficult for rivals to copy and hence drive firm-level performance; this perspective is used in Section VI-C to interpret why training-linked improvements in business management practice matter for competitive positioning, not just for compliance.

The conceptual model tested in this study is shown in Figure 1. Entrepreneurship training is considered as the independent (predictor) variable. The two main outcome variables are financial literacy and business management practice, respectively corresponding to Objectives One and Two. Structural barriers and enablers – capital access, mentorship, market access, peer support and training relevance – are modeled as intervening conditions that determine whether training translates into applied practice, corresponding to Objective Three. Finally, demographic characteristics (age, gender, education and business experience) are modeled as moderating variables, which condition the strength of the training-outcome relationship, corresponding to Objective Four. This structure permits the discussion in Section VI to proceed systematically from the direct effects of training, through the conditions for its application, to the demographic factors that shape its ultimate effectiveness.

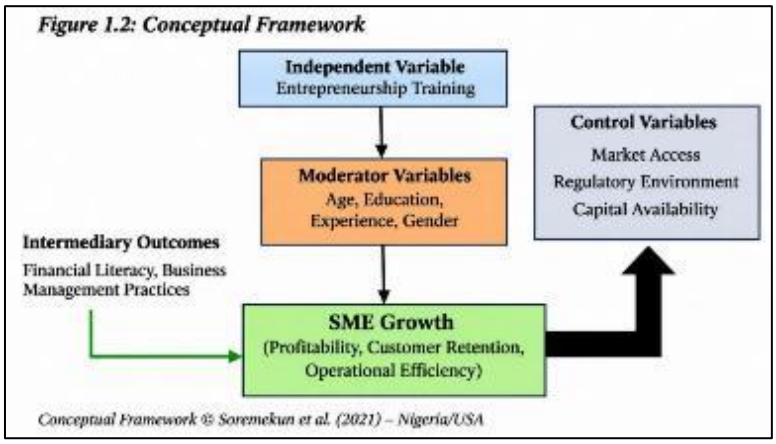


Figure 1: Conceptual framework linking entrepreneurship training to SME growth.

From this framework, four testable hypotheses follow directly from the four study objectives, summarized in Table I alongside their empirical outcome, anticipating the detailed results reported in Section VI.

Table 1: Summary of study objectives, research hypotheses, and empirical outcomes

Study objective	Research hypothesis	Empirical outcome
1. Assess the influence of entrepreneurship training on financial literacy.	H1: Entrepreneurship training is positively associated with financial-literacy practices.	Supported: trained respondents reported higher adoption of all six practices. Monthly budgeting: 82.4% trained vs. 25.8% untrained; $\chi^2 = 22.15$, $p < .001$.
2. Examine the impact of training on business management practices.	H2: Entrepreneurship training is positively associated with business-management practices.	Supported by the reported overall pattern: trained respondents showed higher engagement in costing, inventory control, customer engagement, marketing, and record-keeping. Specific associations included record-keeping by education ($p < .001$) and customer engagement by gender ($p = .045$).
3. Identify barriers and enablers affecting training application.	H3: Structural barriers constrain, while enabling support facilitates, application of training.	Descriptive support: capital constraints were the leading barrier (60.0%); peer support (54.3%) and access to tools/workspace (50.0%) were the leading enablers.
4. Investigate demographic moderation of training effectiveness.	H4: Training application differs significantly by demographic characteristics.	Supported for age ($\chi^2 = 18.67$, $p < .001$), education ($\chi^2 = 30.66$, $p < .001$), and business experience ($\chi^2 = 8.18$, $p = .017$). Gender was described rather than tested inferentially because of perfect separation.

Source: Study objectives and empirical results reported in Sections IV–VI of the article. Hypotheses are stated in testable form from the four objectives.

5 METHODOLOGY

5.1 Research Design

A mixed-methods case study design was employed, comprising descriptive quantitative analysis and thematic qualitative analysis to provide both breadth and depth of understanding. The case study approach was appropriate to the bounded, geographically concentrated nature of the Katima Mulilo Road metal fabrication cluster, allowing the researcher to study training effects in their real operating context, rather than in the abstract. A convergent design was employed where quantitative and qualitative data were collected concurrently from the same respondents during the same field visits, rather than sequentially, so that qualitative responses could be interpreted directly against each respondent's own quantitative profile (trained/untrained, demographic category) rather than as a separate, unlinked data source.

5.2 Population, Sampling, and Sample Size

The target population was youth-led operators in metal fabrication SMEs along Katima Mulilo Road, Lusaka. There was no formal sampling frame for informal operators. A purposive sampling strategy was used to identify the eligible respondents, deliberately capturing both trained and untrained operators so that a comparative analysis would be possible. The sample size of 70 respondents was deemed sufficient to detect meaningful associations with chi-square tests and feasible within the resource and time constraints of a Master's level study. Respondents were identified by a combination of systematic walking the corridor workshop by workshop and snowball referrals from initial contacts. Quotas were informally monitored during fieldwork to avoid overrepresenting any single age band, gender or education level in comparison to the researcher's prior knowledge of the composition of the corridor.

5.3 Sample Adequacy and Robustness

The sample of 70, while modest by large-scale survey research standards, compares favorably with similar Master's-level and evaluative studies of informal-sector training in the region, several of which report samples in the 50-100 range [2], [15]. Cell count adequacy was checked for all chi-square tests reported in Section VI, and where more than 20% of expected cell counts were below five (a conventional threshold for chi-square reliability), this is noted in conjunction with the relevant result (in the discussion of Table VIII and its associated footnote on expected counts). When a test could not be computed due to perfect separation, such as with the gender-by-training-application analysis in Section VI-E, it is reported transparently as a descriptive rather than inferential finding, rather than omitted or forced into an unreliable statistical test.

5.4 Data Collection and Analysis

Semi-structured questionnaires were used to collect data. These questionnaires included closed-ended items (for descriptive and inferential statistical analysis) and open-ended items and follow-up key-informant interviews (for thematic qualitative analysis). Quantitative data were analyzed using descriptive statistics (frequencies and percentages) and Pearson chi-square tests of association between demographic variables and training status and business practice indicators. Qualitative responses on barriers and enablers were thematically coded and quantified as frequency counts to allow for direct comparison with the quantitative findings. The triangulation of these two strands added credibility and interpretive depth to the findings.

5.5 Instrument Design and Reliability

The questionnaire was formulated in five sections dependent on the objectives of the study, which are respondent demographics, financial literacy practices, business management practices, barriers and enablers to training application, and training exposure and interest. Closed-ended items were formatted categorically and in Likert-type formats to facilitate frequency-based and chi-square analysis. A smaller set of open-ended items was used to gather qualitative detail on perceived barriers and enablers, which was then coded into the thematic categories reported in Section VI-D. The instrument was piloted with a small number of operators outside of the final sample to check for question clarity and time to respond prior to full deployment. Minor adjustments in wording were made to ensure that terms such as “costing” and “inventory control” were understood consistently by respondents with different levels of formal education.

5.6 Variables and Measurement

Table II provides a summary of the operationalization of each construct in the conceptual framework (Fig. 1). The independent variable, training exposure, was operationalized as a binary indicator (received structured training: yes/no) in addition to a categorical variable for formal versus informal training sources. The two main outcome variables, financial literacy and business management practice, were measured through a battery of specific behavioral indicators (. “Prepares a monthly budget”, “tracks inventory”) rather than a single composite score. This allowed the analysis to identify which specific practices were most and least responsive to training, as reported throughout Section VI. Barriers and enablers were collected using structured checklists with open-ended probes added to facilitate comparability with the quantitative indicators and then converted to frequency counts. Demographic moderators (age, gender, education, business experience) were measured categorically to allow for chi-square testing of association with each outcome.

Table 2: Study Variables and Measurement Approach

Construct	Measurement	Role
Training exposure	Binary + source type (formal/informal)	Independent variable
Financial literacy	6 behavioural indicators (Table V)	Outcome (Objective 1)
Business management practice	5 practice areas (Table VI)	Outcome (Objective 2)
Barriers / enablers	Checklist + open-ended, coded to frequency	Intervening condition (Objective 3)
Age, gender, education, experience	Categorical demographic variables	Moderators (Objective 4)
Training application	Binary (applied/not applied), trained subsample only	Outcome (Objective 4)

Source: Study instrument design, 2025.

5.7 Ethical Considerations and Limitations

All respondents gave informed consent to participate on a voluntary basis and all individual responses were kept confidential. To minimize response bias, no incentives were offered for participation beyond a brief refreshment during data collection sessions and respondents were assured that non-participation would not affect any existing relationship with training providers or local authorities. As is the case with any purposive, cross-sectional design, the findings are context-specific to the Katima Mulilo Road cluster and cannot be generalized to other trades or locations without caution. The cross-sectional design also limits causal inference since training status and outcomes were measured at a single point in time. Another limitation is that “training received” was self-reported and not independently verified against training-provider attendance records and may induce some recall or social-desirability bias, especially for the financial-literacy behavioral indicators, where respondents may overreport desirable practices such as budgeting.

6 RESULTS AND DISCUSSION

6.1 Background Characteristics of Respondents

Table III summarizes the demographic profile of the 70 respondents. The sample was predominantly mature and experienced, with 65.7% of respondents aged between 26 and 35 years and 72.8% reporting over three years of business experience. The sector was male-dominated (68.6% male versus 31.4% female), and just over half (54.3%) of respondents had already been exposed to some form of entrepreneurship training prior to the study.

Table 3: Background Characteristics of Respondents (N = 70)

Variable	Category	%
Age	20–25 yrs	21.4
	26–30 yrs	30.0
	31–35 yrs	34.3
	36–40 yrs	14.3
Gender	Male	68.6
	Female	31.4
Education	Primary	14.3
	Secondary	50.0
	Tertiary	21.4
	Vocational	14.3
Experience	< 1 yr	8.6
	1–2 yrs	41.4
	3–5 yrs	17.1
	> 5 yrs	32.9
Trained before?	Yes	54.3
	No	45.7

Source: Primary data, 2025.

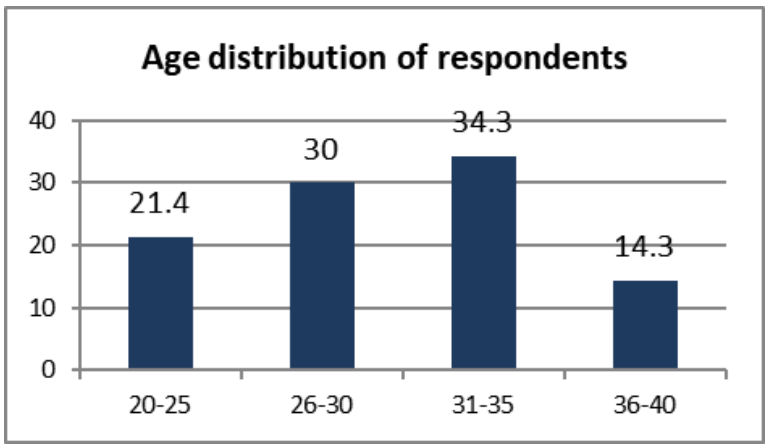


Figure 2: Age distribution of respondents.

Source: Primary data, 2025.

This demographic profile matters for interpreting the results that follow: because the sample skews toward operators with three or more years in business, the training effects reported in Sections VI-B and VI-C should be read as effects

among a reasonably established cohort of informal entrepreneurs rather than brand-new start-ups, which is a distinct but equally policy-relevant population.

Interest in future entrepreneurship training was overwhelmingly high (91.4% overall) and was significantly associated with age ($\chi^2 = 7.88$, $p = .048$): interest declined among the oldest cohort (36–40 years, 70.0%) relative to near-universal interest among younger operators (90.5%–100.0%). No significant association was found between training interest and either education level ($p = .679$) or business experience ($p = .172$), indicating broad-based demand for training across the sample.

Table 4: Training Interest by Demographic Characteristics

Factor	Range of interest (%)	χ^2	df	p
Age group	70.0 – 100.0	7.88	3	.048*
Education level	88.2 – 100.0	1.52	3	.679
Business experience	82.8 – 100.0	4.99	3	.172

Source: Primary data, 2025. *Significant at $p < .05$.

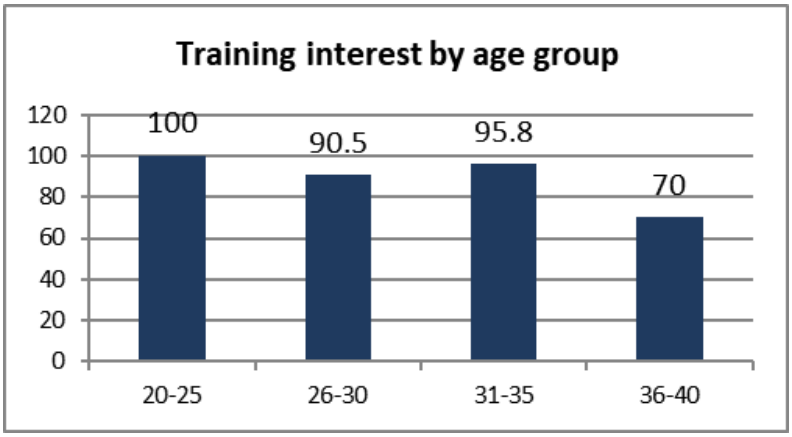


Figure 3: Interest in entrepreneurship training by age group.

Source: Primary data, 2025

Table IV situates this pattern more formally: age is the only demographic factor that significantly differentiates training interest, and Fig. 3 shows this is driven almost entirely by the drop-off among the oldest cohort rather than a gradual decline across the age range. This has direct implications for outreach design, discussed further in Section IX: targeted, tailored messaging—rather than a generic recruitment campaign—may be required to bring older operators into training programmes at comparable rates to their younger counterparts.

6.2 Entrepreneurship Training and Financial Literacy

Objective one examined whether entrepreneurship training improves financial literacy. As Table V and Fig. 4 show, trained respondents reported substantially higher adoption of every financial practice measured. The largest gap was in formal budgeting: 82.4% of trained respondents prepared a monthly budget compared with only 25.8% of untrained respondents—a more than three-fold difference ($\chi^2 = 22.15$, $p < .001$). A cross-tabulation of budgeting practice by type of training received further confirmed this pattern ($\chi^2 = 66.11$, $df = 2$, $p < .001$): none of the untrained respondents reported budgeting, while the overwhelming majority of budgeters had received either formal or informal training.

These findings support Objective One and affirm Human Capital Theory: structured training measurably raises financial competencies that are foundational to enterprise sustainability [3], [6], consistent with international evidence that business training improves financial record-keeping and decision-making among young entrepreneurs [8], [9].

The magnitude of these gaps is worth situating against comparable international evidence. Bruhn and Zia's randomized evaluation of youth business training in Bosnia reported improvements in record-keeping of a similar order of magnitude—roughly two- to three-fold relative to untrained comparison groups [8]—suggesting that the effect sizes observed along Katima Mulilo Road are broadly consistent with, rather than exceptional relative to, the wider evidence base. What distinguishes the present findings is the particularly strong effect on formal budgeting specifically (an 82.4% versus 25.8% adoption gap), which may reflect the fact that budgeting was the most heavily emphasized module in the informal and formal training programmes accessed by respondents, reinforcing the OECD/INFE's observation that

behavioral financial-literacy indicators respond most readily to targeted, skills-specific instruction [11]. The comparatively smaller—though still statistically significant—gap in digital-tool usage (57.9% versus 21.9%) likely reflects infrastructural constraints (device and data costs) rather than a lack of training content, a distinction with direct relevance for how future programmes should be designed and resourced.

Table 5: Financial Literacy Practices by Training Status

Practice	Received training (%)	Not received training (%)
Monthly budget	82.4	25.8
Tracks expenses	89.5	8.3
Calculates margins	76.3	8.3
Reinvests profits	78.9	57.9
Separates finances	68.4	2.8
Uses digital tools	57.9	21.9

Source: Primary data, 2025

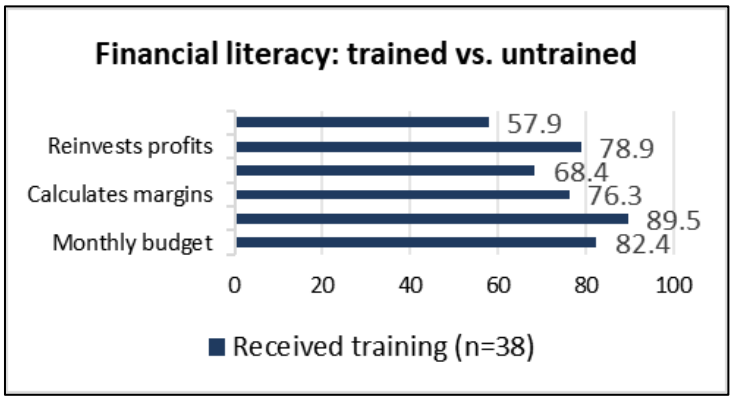


Figure 4: Financial literacy practices: trained vs. untrained respondents.

Source: Primary data, 2025

Qualitative interview responses helped explain the mechanism behind these gaps. Several trained respondents described budgeting and margin calculation as skills they had never previously considered formal "business" activities, treating pricing instead as an intuitive judgement based on material cost and rough labor time. Training appeared to reframe these judgements as calculable, repeatable procedures—converting tacit pricing intuition into an explicit, teachable routine, which is consistent with the codifiable/tacit distinction discussed in Section III-D [5]. Untrained respondents, by contrast, more often described financial record-keeping as "unnecessary" for a small operation or as something that only "real" registered businesses needed to do, suggesting that part of the training effect operates through shifting perceived relevance, not only through skill transfer narrowly defined.

6.3 Business Management Practices

For Objective Two, training exposure was also strongly associated with adoption of core business management practices—costing, inventory control, customer engagement, marketing, and record-keeping. As illustrated in Fig. 5, trained respondents recorded consistently higher engagement (typically 65–75 occurrences) across all five practice areas than untrained respondents (typically 10–15 occurrences), a uniform disparity that underscores training's role in building operational discipline.

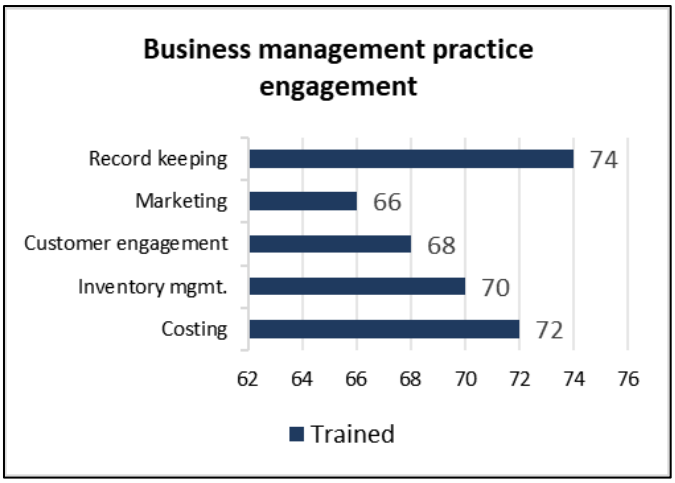


Figure 5: Business management practice engagement by training status.

Source: Primary data, 2025

Costing practice showed a distinctive pattern: rather than costing frequency being strongly linked to training status directly, it was strongly linked to training interest, with virtually all respondents who costed infrequently still expressing strong interest in training (100.0% among those who rarely or never costed), as shown in Fig. 6. Even respondents who already costed frequently retained high interest (88.5%), suggesting training is viewed as valuable for refinement as well as remediation.

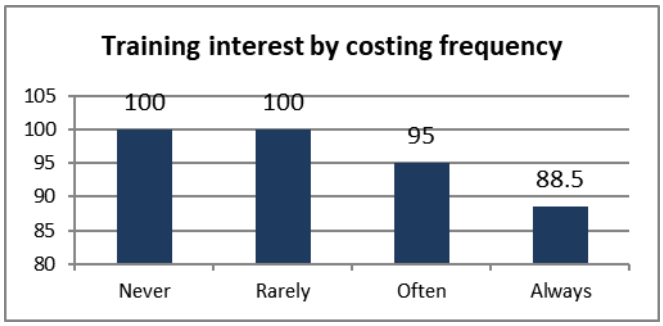


Figure 6: Interest in training by costing engagement frequency.

Source: Primary data, 2025

Disaggregated analysis reinforced the overall pattern. Inventory control was significantly associated with business experience (χ^2 = 29.07, df = 9, p = .001), with entrepreneurs holding 1–2 years of experience most likely to track inventory frequently (57.7%), while those with more than five years showed more mixed behavior—some tracking consistently, others neglecting it entirely—suggesting that experience alone does not guarantee operational discipline and that training reinforces habits that tenure alone does not.

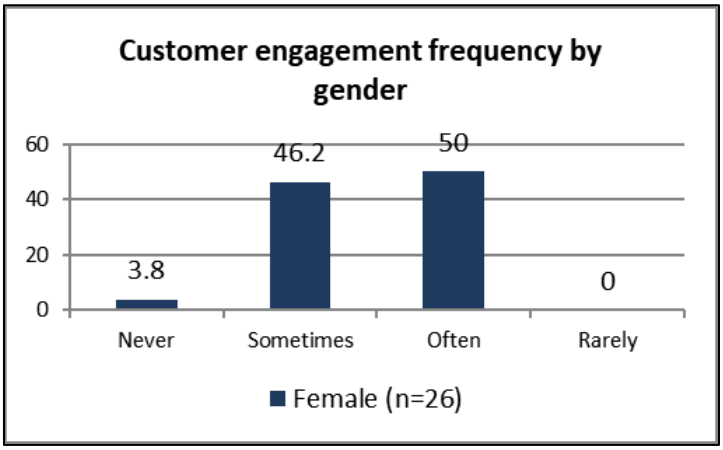


Figure 7: Customer engagement frequency by gender

Source: Primary data, 2025

Customer engagement differed significantly by gender ($\chi^2 = 8.04$, df = 3, p = .045). As Fig. 7 shows, female respondents were more concentrated in the "Often" and "Sometimes" categories (50.0% and 46.2% respectively), while male respondents were more dispersed across all four frequency categories, including a higher "Never" rate (25.0% versus 3.8% for females). Both genders nonetheless reported broadly frequent client interaction overall, and the Resource-Based View frames such interaction capability as accessible across demographic lines once basic training exposure occurs [5].

Record-keeping frequency was strongly associated with education level ($\chi^2 = 48.63$, df = 9, p < .001), and Fig. 8 makes the contrast explicit: 56.3% of tertiary-educated and 44.1% of secondary-educated respondents reported always keeping records, compared with 0% of primary-educated respondents, who instead were concentrated in the "never" category (20.0%). This pattern is consistent with Human Capital Theory's prediction that formal education builds the cognitive and procedural foundation for structured business management [3], [6].

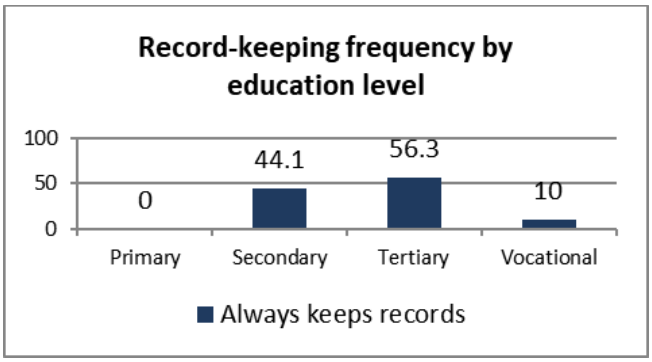


Figure 8: Record-keeping frequency by education level.

Source: Primary data, 2025

Marketing frequency stood out as the one practice not significantly associated with training interest ($\chi^2 = 3.81$, df = 3, p = .283), as shown in Fig. 9. Unlike costing, budgeting, or record-keeping—each of which depends primarily on an internal discipline that training can directly instill—marketing effectiveness in this sector is also shaped by external, demand-side conditions such as footfall along Katima Mulilo Road, competitor density, and customers' own purchasing power, none of which training can influence directly. This distinction suggests that not all managerial capabilities are equally trainable in isolation: interventions aimed at marketing outcomes specifically may need to be paired with demand-side measures, such as the market-infrastructure improvements recommended in Section IX, rather than curriculum content alone.

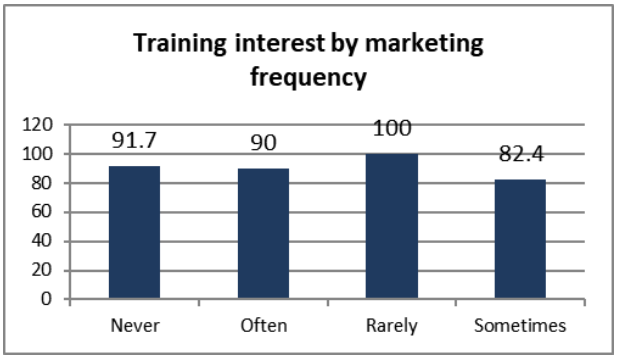


Figure 9: Interest in training by marketing engagement frequency.

Source: Primary data, 2025

Table VI summarizes the chi-square results for the business-practice associations tested across this subsection. These results are collectively consistent with the Resource-Based View, which frames managerial capability as an internal resource that, once developed through training, education, and experience, becomes difficult for competitors to replicate [5], [7].

Table 6: Associations Between Business Management Practices and Respondent Characteristics

Practice	Associated with	χ^2	df	p
Costing frequency	Training interest	—	—	n.s.
Inventory control	Business experience	29.07	9	.001
Customer engagement	Gender	8.04	3	.045
Marketing frequency	Training interest	3.81	3	.283
Record-keeping	Education level	48.63	9	<.001

Source: Primary data, 2025. n.s. = not formally tested by chi-square in the source data.

Taken together, the five practice-level results in this subsection suggest a graded hierarchy of trainability, from most to least directly responsive to instruction: record-keeping and costing appear highly responsive to formal instruction and education; inventory control responds more to accumulated operational experience, with training reinforcing rather than substituting for tenure; customer engagement is shaped by both training exposure and gender-linked social factors; and marketing remains the most externally constrained practice, only weakly linked to training status at all. This gradient is useful for sequencing curriculum design: providers with limited contact hours should priorities costing and record-keeping content, where the evidence for direct training impact is strongest, while treating inventory and marketing modules as longer-horizon investments that depend on complementary experience or market conditions to bear out.

6.4 Barriers and Enablers to Training Application

Objective Three investigated why training does not always translate into changed practice. Capital constraints were the most frequently cited barrier (60.0%), followed by mentorship gaps (25.7%), unmet training-support needs (17.1%), market access issues (14.3%), and residual financial literacy gaps (11.4%), as shown in and Fig. 10.

Table 7: Barriers To Applying Entrepreneurship Training

Barrier	%
Capital constraints	60.0
Mentorship gaps	25.7
Training support needed	17.1
Market access issues	14.3
Financial literacy gaps	11.4

Source: Primary data, 2025.

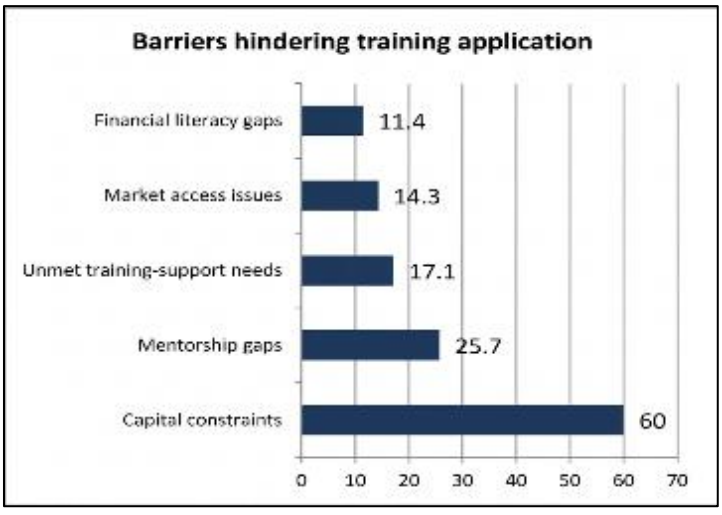


Figure 10: Barriers hindering the application of entrepreneurship training.

Source: Primary data, 2025

Conversely, peer support (54.3%), access to tools and workspace (50.0%), and relevance of training content (42.9%) were the strongest enablers, followed by follow-up mentorship (31.4%) and community recognition (25.7%), as shown in Fig. 11.

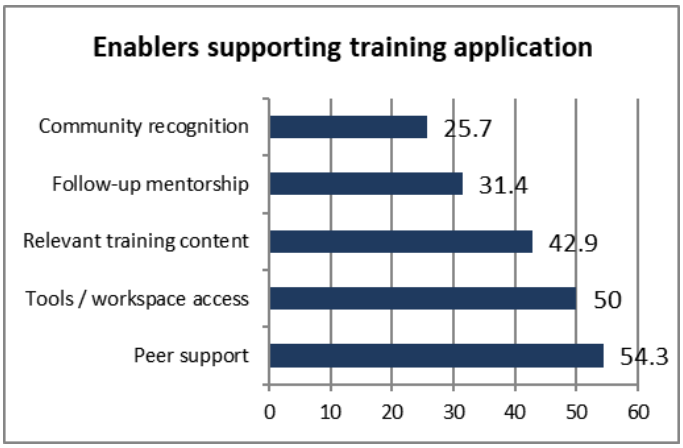


Figure 11: Enablers supporting the application of entrepreneurship training.

Source: Primary data, 2025

These results suggest that training alone is necessary but not sufficient: application is contingent on complementary access to capital, mentorship, and peer networks, echoing calls in the literature for integrated policy approaches that pair skills development with enabling structural support [10], [11].

It is notable that the same underlying factor—access to capital—appears on both sides of the ledger in related but distinct forms: as the leading barrier to applying training (60.0%) and, indirectly, as a precondition for benefiting from several of the leading enablers, since peer cooperative arrangements and shared tool or workspace access (50.0%) are themselves partial substitutes for individual capital. This pattern is consistent with African Development Bank analysis identifying constrained access to finance as the single most binding constraint on SME growth across the continent [14], and it implies that entrepreneurship training providers operating in similar informal clusters should budget for, or actively broker, complementary financing linkages rather than treating curriculum delivery as a self-contained intervention.

6.5 Demographic Moderators of Training Effectiveness

Objective Four assessed whether demographic characteristics moderate the effectiveness of training application. As Table VIII shows, age ($\chi^2 = 18.67$, $p < .001$), education level ($\chi^2 = 30.66$, $p < .001$), and business experience ($\chi^2 = 8.18$, $p = .017$) were all significantly associated with whether training was applied in practice. Training application increased with age, education, and experience, with the highest application rates among the 36–40 age group, tertiary-educated respondents, and operators with three or more years of experience. Gender differences could not be tested by chi-square because all female respondents who received training reported applying it (a perfect-separation case), but the descriptive pattern suggests full uptake among trained women compared with partial uptake among trained men.

Table 8: Demographic Moderators of Training Application

Variable	χ^2	df	p
Age group	18.67	1	<.001
Education level	30.66	2	<.001
Business experience	8.18	2	.017

Source: Primary data, 2025 (n = 70).

Fig. 12 and Fig. 13 disaggregate the application rate by age group and education level respectively, making the monotonic age pattern and the more uneven education pattern directly visible. Application rose steadily from 33.3% among the youngest operators (20–25 years) to 77.8% among the oldest (36–40 years). By contrast, the education pattern was non-monotonic: vocational graduates recorded the highest application rate (66.7%), ahead of tertiary graduates (58.3%) and secondary graduates (55.6%), with primary-educated operators lowest (40.0%)—suggesting that practical, hands-on vocational training may translate into applied practice at least as effectively as more academic tertiary qualifications.

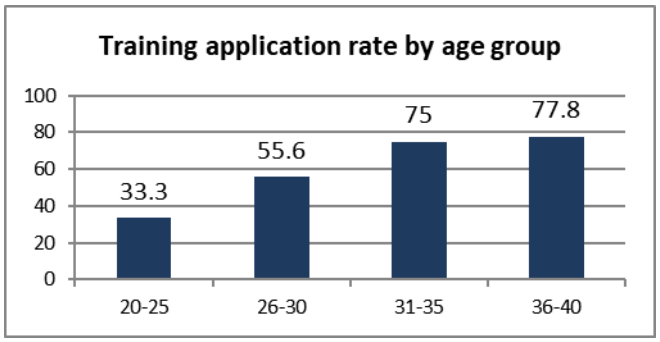


Figure 12: Training application rate by age group.

Source: Primary data, 2025

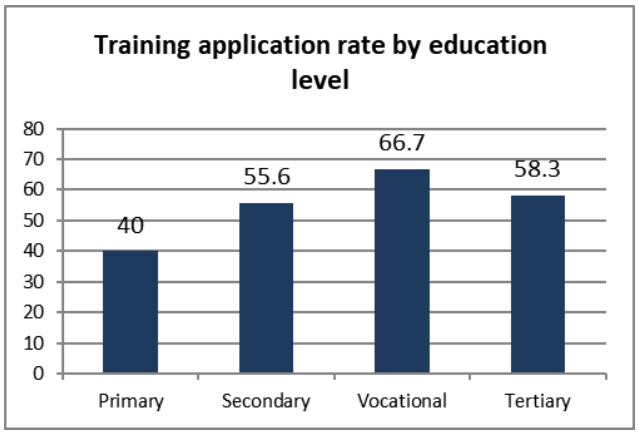


Figure 13: Training application rate by education level.

Source: Primary data, 2025

Table 9: Training Application Rate by Experience and Gender

Variable	Category	Applied (%)
Business experience	< 1 year	44.4
	1–2 years	66.7
	3+ years	58.8
Gender	Male	60.9
	Female	58.3

Source: Primary data, 2025 (n = 70).

These results validate the conceptual framework's treatment of demographic factors as moderators, and align with prior work showing that maturity and prior exposure strengthen the transfer of training into practice [12], [13]. Younger apprentices were more receptive to digital financial tools, while older participants leaned on traditional methods; female apprentices reported additional mobility- and market-access-related constraints, pointing to a need for gender-sensitive training design.

A closer look at the age pattern is instructive: application rose almost monotonically from the youngest to the oldest cohort even though training interest itself was highest among younger operators (Section VI-A). This apparent tension—the oldest cohort being least interested in training yet, once trained, most likely to apply it—suggests that older operators are more selective about engaging with training in the first place, but convert that engagement into practice more reliably once they do, plausibly because they have more established operations in which new practices can be immediately embedded. This has direct implications for how outreach and curriculum pacing should differ across age groups, discussed further in Section IX.

6.6 Qualitative Insights from Respondent Interviews

Beyond the quantitative associations reported in Sections VI-A to VI-E, semi-structured interviews surfaced recurring qualitative themes that help explain the mechanisms behind the statistical patterns. Table X summarizes the dominant themes identified through thematic coding, alongside an illustrative paraphrase of how each theme typically surfaced in respondent accounts (paraphrased rather than quoted verbatim, consistent with the study's confidentiality undertakings to respondents).

Table 10: Qualitative Themes from Respondent Interviews

Theme	Illustrative pattern in responses
Pricing as intuition, not calculation	Untrained respondents described pricing jobs "by feel" based on material cost alone, without factoring in labour time or overheads
Training as a trigger for reframing	Trained respondents frequently described a specific moment—usually the budgeting module—when they began treating the business as separate from personal finances
Capital as the recurring constraint	Across both trained and untrained respondents, the most common reason given for not investing in tools, stock, or a permanent structure was lack of savings or access to affordable credit
Peer workshops as informal classrooms	Several respondents described learning costing or record-keeping practices from a neighbouring, more established operator rather than from formal training alone
Scepticism among older, established operators	Some older respondents expressed doubt that classroom-style training could add value beyond what years of practical experience had already taught them, even while still supporting the idea of training for younger apprentices

Source: Thematic analysis of semi-structured interviews, 2025.

These themes reinforce the quantitative findings in two specific ways. First, the "pricing as intuition" and "training as a trigger for reframing" themes together illustrate the mechanism behind the large training effect on budgeting observed in Section VI-B: training does not appear to teach an entirely new skill so much as it converts an existing informal judgement into an explicit, repeatable procedure. Second, the prominence of the capital-constraint theme across both trained and untrained respondents corroborates the barrier ranking in Section VI-D, and the qualitative accounts suggest that this constraint is experienced as chronic and structural—consistently raised unprompted—rather than as an occasional or situational problem, reinforcing the case for pairing training with financing interventions made in Sections VII-B and IX.

6.7 Integrated Discussion

Table 11: Comparative Summary of Entrepreneurship Training Effects: This Study Versus Selected International Evidence

Study / context	Outcome measured	Reported effect
This study (Zambia, metal fabrication)	Monthly budgeting, trained vs. untrained	82.4% vs. 25.8%
Bruhn & Zia [8] (Bosnia, youth business training)	Record-keeping, trained vs. comparison	~2–3× higher
Bruhn, Karlan & Schoar [9] (Mexico, consulting)	Managerial practice score	Significant increase
Cho & Honorati [10] (multi-country meta-analysis)	Business knowledge/survival	Modest, positive on average

Table 12: summary of objectives, key findings, and significance

Objective	Key finding	Sig.
1. Financial literacy	Training raises adoption of budgeting, tracking, margins, reinvestment	$p < .01$
2. Management practice	Training raises costing, inventory, engagement, record-keeping	$p < .05$
3. Barriers/enablers	Capital & mentorship gaps limit uptake; peer support enables it	descriptive
4. Demographic moderators	Age, education, experience moderate application	$p < .05$

7 THEORETICAL AND PRACTICAL IMPLICATIONS

- Implications for Theory
- Implications for Practice
- A Proposed Curriculum Sequencing Model

Table 13: Proposed Curriculum Sequencing by Demonstrated Trainability

Phase	Content focus	Rationale
1 (weeks 1–2)	Costing and monthly budgeting	Strongest, fastest-responding indicators (Section VI-B/C)
2 (weeks 3–4)	Record-keeping and expense tracking	Strong response, reinforced by literacy-appropriate templates
3 (weeks 5–6)	Inventory control	Responds to training combined with experience; needs practice time
4 (weeks 7–8)	Customer engagement and marketing	Most externally constrained; pair with market-access support

8 CONCLUSION

This study set out to determine how entrepreneurship training affects SME growth among youth-led informal metal fabrication enterprises along Katima Mulilo Road, Lusaka. The evidence is consistent across all four objectives: entrepreneurship training significantly improves financial literacy and business management practice; its practical application is nevertheless constrained by capital, mentorship, and market-access gaps and is supported by peer networks and relevant content; and its effectiveness is significantly moderated by age, education, and experience. Taken together, these findings affirm that entrepreneurship training is a necessary but not sufficient condition for SME growth—it must be paired with context-sensitive, enabling support to translate skill into sustained enterprise performance.

Theoretically, the study lends empirical support to all three anchoring frameworks in the informal Zambian setting. Human Capital Theory is supported by the consistent, statistically significant gains in financial literacy attributable to training. Social Learning Theory is supported by the prominence of peer support as the single strongest enabler of training application, ahead of formal follow-up mechanisms. The Resource-Based View is supported by the finding that business management competencies—not just technical fabrication skill—are what differentiate the operational practice of trained and untrained operators, positioning managerial capability as the scarcer, and therefore more strategically valuable, resource in this sector.

The study also speaks to a question of practical significance beyond its immediate sample: whether entrepreneurship training is a worthwhile use of scarce donor, government, and NGO resources in informal manufacturing contexts specifically, as opposed to the trading and services contexts more commonly studied in the literature. The consistency of the behavioral gains documented here—across financial literacy and business management practice alike, and holding regardless of the specific demographic subgroup examined—suggests that the answer is affirmative, provided training is delivered alongside, rather than instead of, complementary capital and market-access support. Entrepreneurship training in this setting should therefore be understood and funded as one module within a wider enterprise-development package, not as a stand-alone deliverable whose success can be judged by attendance or satisfaction metrics alone.

Limitations and Directions for Future Research

The cross-sectional design means the study can establish association but not definitive causal direction between training and practice; a longitudinal or experimental design—following the same cohort before and after a defined training intervention—would strengthen causal claims. The purposive sample of 70 operators, while adequate for the chi-square analyses reported here, limits the precision of subgroup estimates (for example, the gender-by-training-application analysis) and constrains generalizability beyond the Katima Mulilo Road cluster. Future research could usefully extend this design to other informal trade corridors in Lusaka and other Zambian cities to test whether the training effects and moderating patterns observed here replicate across sectors, and could incorporate longer-term financial performance indicators—revenue, formal registration, employment creation—to establish whether the behavioral gains documented in this study eventually translate into measurable enterprise growth.

A further avenue for future work is cost-effectiveness analysis. The present study establishes that training is associated with strong behavioral gains, but it does not estimate the cost per unit of behavioral change, nor compare this cost-effectiveness against alternative interventions such as direct capital grants or market-infrastructure investment alone. Given that this study identifies capital access as the leading barrier to applying training, a natural next step would be a comparative evaluation of training-only, capital-only, and bundled training-plus-capital interventions, to establish which combination yields the greatest return per dollar invested for informal metal fabrication SMEs specifically.

Recommendations

The recommendations below translate the study's four objectives and integrated discussion (Sections VI–VII) into concrete actions for the four stakeholder groups best placed to act on them. Each set of recommendations is grounded directly in a specific empirical finding rather than offered as generic good practice, and cross-references to the relevant section are provided so that readers can trace each recommendation back to its supporting evidence.

For policymakers and government agencies: integrate entrepreneurship modules into informal apprenticeship programmes (through TEVETA and MSMED), ensuring content is aligned to the specific commercial demands of the metal fabrication sector rather than generic business curricula; improve market infrastructure along Katima Mulilo Road—including secure workspace, signage, and utilities—to support SME visibility and customer access; and facilitate access to microfinance and tailored capital products for youth-led SMEs, given that capital constraints were the single most frequently cited barrier to applying training.

For training institutions and NGOs: design hybrid training models that combine experiential, mentor-led learning with structured business education, leveraging the strong peer-learning culture already evident among apprentices; develop gender-sensitive curricula that explicitly address the mobility and market-access barriers facing female apprentices, building on the finding that trained women show particularly high application rates once barriers are addressed; and institutionalize mentorship and peer-exchange programmes rather than treating training as a single, time-bound event, since mentorship gaps were the second most common barrier to application.

For SME operators and community stakeholders: adopt accessible financial tools such as mobile budgeting apps and simple, low-literacy-friendly record-keeping templates to strengthen financial literacy even in the absence of formal training; participate in cooperative resource-sharing networks to access bulk inputs, shared tools, and negotiated market terms, reflecting the strong role peer support already plays as an enabler; and engage in periodic refresher training to update business skills and adapt to changing market dynamics, rather than relying on a single training exposure.

For researchers: replicate this design in other informal trade corridors and sectors within Zambia to test whether the observed effect sizes and moderating patterns generalize beyond metal fabrication; adopt longitudinal or quasi-experimental designs where feasible to strengthen causal inference; and extend the outcome set beyond behavioral indicators to longer-term firm performance measures such as revenue, registration status, and employment, in order to establish whether the strong behavioral gains documented here (Section VI-B, VI-C) ultimately translate into the enterprise growth that policy interventions in this space are intended to produce.

Taken together, these recommendations are deliberately layered rather than sequential: policy-level capital and infrastructure interventions, institution-level curriculum and mentorship redesign, and operator-level adoption of low-cost tools can and should proceed concurrently. None of the three levels is sufficient alone—capital access without commercial skill risks misallocated investment, while commercial skill without capital access risks the application gap documented in Section VI-D repeating itself. The evidence from this study suggests that the highest-return point of intervention, given current conditions along Katima Mulilo Road, is the interface between training delivery and capital access: ensuring that the operators most receptive to training—younger apprentices and women, per Section VI-E—are simultaneously connected to the financial products they need to act on it.

Declarations

Funding: This research received no external or third-party funding. Fieldwork and data collection costs were met by the author as part of the requirements for the Master of Business Administration degree at the Information and Communication University (ICU).

Conflicts of Interest: The author declares no conflict of interest. No training provider, financial institution, or government agency named in this article funded, commissioned, or reviewed the research prior to submission.

Data Availability: The primary dataset underlying this article was collected as part of the author's Master's thesis and is held by the author and the Information and Communication University. Aggregated data in the form of the tables reported in this article are available within the article itself; the underlying respondent-level dataset may be made available by the corresponding author on reasonable request, subject to the confidentiality undertakings given to respondents during data collection.

Ethical Approval: The study was conducted in accordance with the research ethics requirements of the Information and Communication University. Informed consent was obtained from all respondents prior to data collection, and respondent confidentiality has been preserved throughout this article, including in the qualitative excerpts summarized in Section VI-F.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

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