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Financial Recording First: An Initial Integrated Model for Strengthening Agribusiness MSME Performance in North Jember, Indonesia

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ABSTRACT
Background: Rural agribusiness MSME assistance often addresses financial recording, production efficiency, and digital marketing in separate activities, although enterprises must coordinate these practices under severe resource constraints.
Aims: This study identifies configurations of these three conditions associated with high and low enterprise performance and uses the findings to construct an initial assistance model.
Methods: Twenty-eight purposively selected enterprises across five subdistricts of North Jember were assessed using a 15-indicator rubric and four performance items. Fuzzy-set qualitative comparative analysis (fsQCA) examined necessary conditions and sufficient configurations. Nine experts and practitioners assessed twelve proposed model components using Lawshe's content validity ratio (CVR).
Results: Financial recording narrowly met the high-performance necessity threshold (consistency = 0.901); this judgment was sensitive to recalibration. The primary high-performance configuration combined financial recording as a core condition and production efficiency as a peripheral condition (consistency = 0.901; coverage = 0.856). Digital marketing was absent from that solution, but its apparent dispensability depended on borderline cases. Weak financial recording occurred in both low-performance solutions. Following review and revision, ten components were retained or integrated into the model.
Conclusion: The evidence supports an initial, financially grounded sequence for enterprise assistance, not a demonstrated intervention effect. Pilot implementation is needed to evaluate whether this proposed sequence improves subsequent performance.

INTRODUCTION

Agribusiness micro, small, and medium enterprises (MSMEs) often confront several managerial problems at once, yet the assistance available to them is commonly delivered as separate bookkeeping, production, and marketing activities. Learning to post on social media is of limited use when an owner cannot identify the margin on an order, just as reducing processing time may not improve income when prices are set without reference to costs. The practical issue is therefore not simply whether each managerial practice is valuable, but whether enterprises need particular combinations of practices to sustain performance. Research on SMEs increasingly treats managerial capabilities as interdependent rather than isolated resources, while also reporting substantial differences in firms' capacity to implement digital and operational changes (Garcia-Martinez et al., 2023; Kallmuenzer et al., 2025; Roffia & Dabić, 2024). For resource-constrained rural enterprises, identifying which practices should receive early attention may be more actionable than promoting each practice with equal urgency (Moursellas et al., 2023; Sagala & Őri, 2024).

In North Jember, East Java, the subdistricts of Kalisat, Sukowono, Sumberjambe, Arjasa, and Pakusari include enterprises linked to coffee, tobacco, processed crops, livestock, freshwater fish, and vegetable trade (Badan Pusat Statistik Kabupaten Jember, 2025; Haryati, 2008). Within these product groups, an owner's daily decisions connect purchases, processing, cash receipts, and

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relationships with collectors or resellers. The first phase of the present project documented low-to-moderate capability across financial recording, production efficiency, and digital marketing, with prominent gaps in recording and online activity; those descriptive findings were reported separately. Such gaps establish a practical need for integrated assistance but do not reveal whether the same practices accompany stronger performance across enterprises. Other research on Indonesian microenterprises also differentiates between mere technology adoption and the depth of its use, reinforcing the need to examine actual combinations of routines rather than platform ownership alone (Affandi et al., 2024; Annosi et al., 2023; Wahyono & Hutahayan, 2021).

The theoretical starting point is the resource-based view, which links performance differences to the organization and use of firm-specific resources (Barney, 1991). Complementarity reasoning adds that the value of a practice may depend on whether another practice is in place (Milgrom & Roberts, 1995). Applied to small agribusinesses, financial records can inform unit costing and pricing, production routines can support the delivery of acceptable output, and marketing can connect that output with buyers; the Indonesian SAK EMKM standard and prior MSME case research provide a relevant accounting reference (Ikatan Akuntan Indonesia, 2016; Putri & Nugroho, 2020). Recent evidence on accounting information systems and managerial control suggests that information becomes useful when it supports operational decisions rather than merely documenting transactions (Alves & Lourenço, 2022; Dahmen & Rodríguez, 2014; Kareem et al., 2024; Lin et al., 2024; Roffia & Dabić, 2024). These arguments motivate an examination of financial recording as a possible enabling condition, without presuming in advance that it must be present in every high-performing enterprise.

The production and market sides of this problem introduce a second layer of interdependence. Process organization, batch scheduling, and reductions in avoidable waste are relevant to the operating constraints of small food and agricultural businesses, but their feasibility differs across products and production systems (Alkhoraif et al., 2019; Despoudi et al., 2025; Dora et al., 2013; Ferrazzi et al., 2025; Moursellas et al., 2023; Rother & Shook, 1999). Digital marketing likewise ranges from occasional posts and messaging to a coordinated commercial capability that incorporates customer responses, channel management, and pricing (Ahmed et al., 2025; Amin et al., 2025; Dwivedi et al., 2021; Martinelli & Tunisini, 2024; Ritz et al., 2019; Wu et al., 2024). Studies of SMEs generally associate digital adoption with business opportunities, but also identify the importance of complementary managerial capabilities and contextual constraints (Borah et al., 2022; Gao et al., 2023; Haq & Huo, 2023; Romero & Mammadov, 2025; Verhoef et al., 2021). Whether these broader observations characterize enterprises selling through local collectors, nearby shops, or informal orders remains an empirical question for the present sample.

Recent empirical work offers competing expectations about the relationship between internal capabilities and firm outcomes. Studies of Indonesian enterprises connect digital adoption with performance and financial literacy, while research on marketing strategy associates digital capability with innovativeness and managerial resources (Affandi et al., 2024; Wu et al., 2024). Financial studies emphasize that literacy, accounting information, and access to resources can shape SME decisions, although their outcomes vary across settings and measures (Basha et al., 2023; Kaiser et al., 2022; Kareem et al., 2024; Siddik et al., 2023). Other research points to a broader set of performance conditions, including age, network position, uncertainty, and resilience, which cannot be reduced to a single managerial practice (Chauhan et al., 2023; Garcia-Martinez et al., 2023; Gurbuz et al., 2023; Nakandala et al., 2025; Ngo, 2022). These studies clarify the relevance of the three practices, but evidence about their individual associations does not determine which specific practices coexist among better-performing rural agribusinesses. This distinction motivates a configurational analysis rather than a further additive test of independent predictors.

Fuzzy-set qualitative comparative analysis (fsQCA) is suited to examining conjunction, equifinality, and causal asymmetry as set-theoretic patterns, without requiring a claim that a cross-sectional sample establishes causal effects (Fiss, 2011; Pappas & Woodside, 2021). Recent entrepreneurship applications show that different resource combinations can be associated with performance, while methodological guidance emphasizes calibration decisions, the treatment of negated outcomes, and checks of solution sensitivity (Duan et al., 2022; Kusa et al., 2025; Nikou et al., 2024; Yu et al., 2024). Nevertheless, a configurational result does not by itself specify a tested order for training or assistance. For that purpose, empirical patterns must be translated into operational components and examined for relevance by people familiar with local enterprises, with content review clearly separated from field validation (Ayre & Scally, 2014; Lawshe, 1975). The unresolved question addressed here is how the three measured practices combine within this particular group of enterprises and how cautiously those observed combinations can inform a preliminary assistance design.

Accordingly, this study first examines whether financial recording (FR), production efficiency (PE), and digital marketing (DM), individually or in combination, are necessary or sufficient for high enterprise performance (PERF), and it separately examines configurations associated with low performance. It then draws on the configurational findings, earlier diagnostic results, and field observations to develop an initial integrated assistance model and assesses the essentiality of its components with an expert-practitioner panel. Three propositions guide the empirical analysis: FR is necessary for high performance; neither PE nor DM is sufficient alone; and high performance may accompany FR combined with at least one of the other two practices, potentially through more than one configuration. The empirical contribution is a case-based account of observed managerial combinations rather than a population-level effect estimate (Patrício & Ferreira, 2023; Yu et al., 2024). The practical contribution is a content-reviewed prototype whose proposed sequence requires subsequent pilot testing before claims of effectiveness can be made.

METHOD

Research design and setting

The study used a configurational, observational design within a larger project on managerial practice among agribusiness MSMEs in North Jember. Each enterprise was treated as a case comprising three condition sets and one performance-outcome set. FsQCA was chosen to examine whether particular conditions were necessary or sufficient and whether different combinations characterized high and low performance; it was not used to estimate population parameters or infer intervention effects (Fiss, 2011; Nikou et al., 2024; Pappas & Woodside, 2021). Data were collected in Kalisat, Sukowono, Sumberjambe, Arjasa, and Pakusari. The enterprise assessments used two visits approximately four to six weeks apart; the original report does not specify a complete fieldwork date range.

Sampling and participating enterprises

Thirty enterprises were purposively identified from village lists and previous campus programs. Inclusion criteria were at least two years of operation; products based on crops, livestock, fish, or processed food; at least one worker besides the owner; and owner consent to show business records. Two enterprises were excluded for incomplete data, leaving 28: processed food (12), coffee processing (6), livestock products (4), freshwater fish (3), and fresh horticulture (3). Twenty-six were microenterprises. The sample supports within-case and cross-case configuration analysis but does not constitute a representative draw from all MSMEs in the region.

Measures and field procedure

The condition measures were the three pillar scores developed in the project's preceding stage: financial recording (FR), production efficiency (PE), and digital marketing (DM). Each pillar consisted of five rubric indicators scored from 1 to 5 using interviews, observation of one complete production batch, and inspection of notebooks and social media accounts, with Cronbach's alpha values of 0.77, 0.75, and 0.84, respectively. Enterprise performance (PERF) combined four anchored 1–5 items: reported sales growth during the previous twelve months (KP1), output per worker-day relative to the previous year (KP2), number of regular customers (KP3), and owner satisfaction with the business (KP4); the four-item alpha was 0.77. KP1 and KP3 were checked against notebooks or order histories where these were available. A different enumerator collected performance data during a second visit approximately four to six weeks after the rubric assessment, to reduce potential dependence between condition and outcome assessments. The original instrument reported written scoring anchors, but the complete item-level rubric and additional construct-validity evidence are not provided here.

Set calibration

Raw pillar and performance scores were calibrated with the direct fuzzy-set method (Ragin, 2008). As the observed scores were concentrated in the lower half of the rubric, the calibration used each measure's 95th percentile as the full-membership anchor, its median as the crossover, and its 5th percentile as the full-non-membership anchor (Table 1), a distribution-based approach discussed in methodological guidance for survey applications (Pappas & Woodside, 2021). Values lying exactly at the crossover were assigned membership 0.501 rather than 0.500 so that they remained in the truth table. Because tied medians affected several cases, the calibration decision was treated as a substantive sensitivity concern rather than an innocuous technical adjustment. Alternative 90th, 50th, and 10th percentile anchors and the exclusion of crossover cases were examined in the robustness analysis (Nikou et al., 2024).

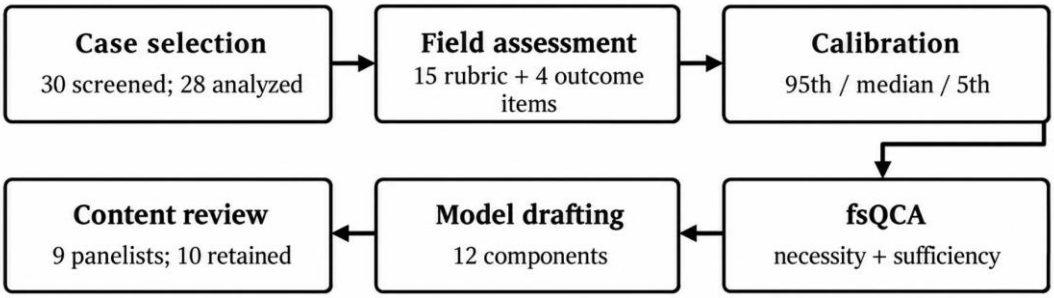

Figure 1. Research and model-development workflow

Table 1. Descriptive statistics and calibration anchors (n = 28)

Measure	Mean	SD	Min–Max	5th pct. (nonmember)	Median (crossover)	95th pct. (member)
Financial recording (FR)	2.30	0.50	1.2-3.2	1.60	2.40	3.13
Production efficiency (PE)	2.64	0.54	1.6-3.6	1.80	2.60	3.40
Digital marketing (DM)	2.20	0.67	1.2-3.4	1.40	2.30	3.33
Performance (PERF)	2.96	0.73	2.0-4.5	2.00	3.00	4.25
KP1 Sales growth	2.93	1.02	1-5			
KP2 Labour productivity	2.57	0.92	1-4			
KP3 Regular customers	3.07	0.94	1-5			
KP4 Owner satisfaction	3.25	0.89	1-5			

Note: Scores on a 1-5 scale. Cronbach's alpha for PERF = 0.77. Cases at the crossover were assigned a membership of 0.501.

Necessity, sufficiency, and robustness analysis

The analysis first evaluated each condition and its negation for necessity in high and low performance, using consistency 0.90 alongside coverage and relevance of necessity. A truth table

then represented the eight possible combinations of FR, PE, and DM, with a minimum frequency of one enterprise; a row was treated as sufficient when raw consistency was at least 0.80 and proportional reduction in inconsistency (PRI) at least 0.70. Complex, intermediate, and parsimonious solutions were compared, with the directional expectation of a positive contribution from the presence of each condition to high performance. Conditions shared by parsimonious and intermediate solutions were designated core; conditions appearing only in the intermediate solution were designated peripheral (Fiss, 2011; Greckhamer et al., 2018; Schneider & Wagemann, 2012). High-performance and low-performance outcomes were analyzed separately to respect configurational asymmetry (Duan et al., 2022; Nikou et al., 2024). Robustness tests used alternative percentile anchors, stricter raw-consistency and PRI thresholds of 0.85 and 0.75, and removal of cases at 0.501 in at least one condition. Analyses were conducted in fsQCA 4.1 and cross-checked in R with the QCA package.

Prototype development and expert-practitioner review

The fsQCA findings were considered together with the first-stage gap ranking and field notes to formulate twelve initial components (C1–C12). A focus group was held on 18 September 2026 with nine panelists: three academics outside the research team (accounting, industrial engineering, and marketing), two officers of the Jember Office of Cooperatives and Micro Enterprises, two MSME field assistants, and two business owners outside the study sample. After discussion, panelists independently classified each component as essential, useful but not essential, or unnecessary. Lawshe's content validity ratio was calculated as CVR = (ne − N/2)/(N/2), where ne is the number of essential ratings and N = 9 (Lawshe, 1975). The critical CVR for N = 9 was 0.778, requiring at least eight essential ratings; components below that value were revised and reassessed, merged, or moved outside the core model (Ayre & Scally, 2014). This procedure assessed perceived content essentiality; no field implementation, fidelity assessment, or pre-post effectiveness test was performed in the reported stage.

RESULTS AND DISCUSSION

Results

Descriptive results

Across the 28 enterprises, performance averaged 2.96 (SD = 0.73) on the five-point scale, ranging from 2.00 to 4.50. Among the four indicators, owner satisfaction had the highest reported mean (KP4 = 3.25), whereas labour productivity had the lowest (KP2 = 2.57); these are descriptive indicators and not directly comparable latent constructs. The three pillar scores were strongly correlated (Spearman's ρ = 0.81–0.87), and financial recording showed the largest correlation with performance (ρ = 0.88) (Table 2). This overlap suggests that enterprises tended to develop multiple practices together, while limiting the distinct configurations observable within the sample. The fsQCA assessed their combinations rather than interpreting separate regression effects.

Table 2. Spearman correlations between pillar scores and performance

Variable	FR	PE	DM	PERF
Financial recording (FR)	1			
Production efficiency (PE)	0.85	1		
Digital marketing (DM)	0.87	0.81	1	
Performance (PERF)	0.88	0.73	0.77	1

Note: All coefficients significant at $p < 0.001$ (two-tailed), n = 28.

Necessary conditions

For high performance, FR was the sole tested condition that met the prespecified 0.90 necessity-consistency cutoff, with consistency 0.901, coverage 0.894, and relevance of necessity 0.920 (Table 3). PE fell just below that criterion (0.897), and DM was lower (0.815), so the small FR–

PE difference does not establish a substantial difference between them. The membership plot (Figure 2) placed most cases near or below the necessity diagonal; U13 and U17 were located at the outcome crossover and are discussed with the divergent cases. For low performance, the absence of recording (~FR) met the necessity threshold (0.914). Proposition 1 received threshold-based support in the primary calibration, but its interpretation remained conditional because FR consistency dropped below 0.90 under an alternative calibration.

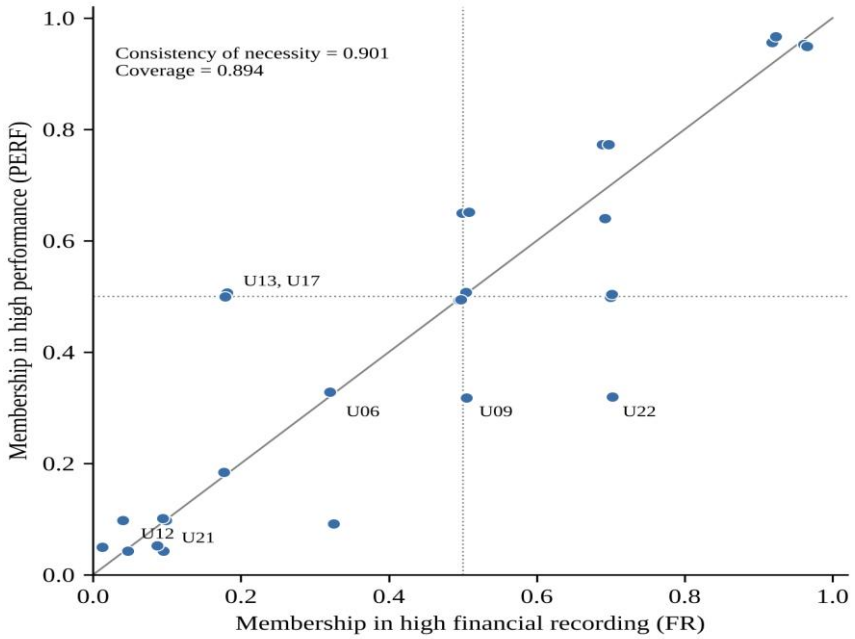

Figure 2. XY plot of membership in financial recording (FR) and high performance (PERF)

Table 3. Analysis of necessary conditions

Condition	High PERF: consistency	Coverage	Relevance	Low PERF (~PERF): consistency	Coverage	Relevance
FR	**0.901**	0.894	0.920	0.455	0.558	0.734
~FR	0.555	0.452	0.599	**0.914**	0.919	0.910
PE	0.897	0.760	0.788	0.514	0.538	0.659
~PE	0.455	0.431	0.663	0.770	0.902	0.919
DM	0.815	0.820	0.874	0.438	0.545	0.733
~DM	0.548	0.441	0.589	0.855	0.851	0.843

Note: ~ denotes negation. Values in bold exceed the 0.90 consistency threshold.

Sufficient configurations for high performance

Five of the eight logically possible configurations were observed (Table 4). The FR*PE*DM row (13 cases) and the FR*PE*~DM row (three cases) exceeded the raw-consistency and PRI thresholds. By contrast, the PE-only row had raw consistency 0.835 but PRI 0.234 and was not classified as sufficient; the ~FR*~PE*DM row likewise failed on PRI. No enterprise occupied the FR*~PE*DM or FR*~PE*~DM rows, preventing inference about high recording without efficient production. The small number of cases in the FR*PE*~DM row is important for interpreting the role of digital marketing.

Table 4. Truth table for high performance

FR	PE	DM	n	Raw consistency	PRI	PERF	Cases
1	1	1	13	0.917	0.834	1	U02, U03, U04, U09, U10, U18, U19, U20, U22, U23, U24, U25, U26
1	1	0	3	0.968	0.772	1	U01, U11, U16
0	1	0	3	0.835	0.234	0	U12, U17, U21
0	0	1	1	0.843	0.144	0	U06
0	0	0	8	0.443	0.049	0	U05, U07, U08, U13, U14, U15, U27, U28

Note: Rows 101, 100, and 011 had no cases (logical remainders). Thresholds: raw consistency 0.80, PRI 0.70, frequency 1.

The complex and intermediate high-performance solutions converged on FR*PE (consistency = 0.901; coverage = 0.856), while the parsimonious solution retained FR alone (Table 5). Under the stated solution-comparison convention, FR was labeled a core condition and PE a peripheral condition. DM did not appear in the intermediate solution, indicating that its membership did not distinguish the two observed sufficient rows at the primary calibration; this does not establish a general lack of benefit from marketing. Proposition 2 was supported within the observed combinations. Proposition 3 received partial support because only one high-performance solution emerged, while a possible FR-with-DM profile in the absence of PE could not be evaluated due to unobserved configurations.

Table 5. Configurations for high and low performance

Condition	High PERF: H1	Low PERF: L1	Low PERF: L2	Remarks
Financial recording (FR)	●	⊗	⊗	core in all
Production efficiency (PE)	•	⊗ (small)		
Digital marketing (DM)			⊗ (small)	
Raw coverage	0.856	0.760	0.825	
Unique coverage	0.856	0.053	0.118	
Consistency	0.901	0.941	0.941	
Solution coverage	0.856	0.878		
Solution consistency	0.901	0.939		

Note: ● = core condition present; • = peripheral condition present; ⊗ = core condition absent; ⊗ (small) = peripheral condition absent; blank = condition does not matter. Intermediate solutions shown; core conditions also appear in the parsimonious solution.

Cases that do not fit

The FR*PE solution covered 16 enterprises, of which 14 were classified as high performing. U09, a coffee processor in Sukowono, and U22, a snack producer in Arjasa, displayed relatively favorable pillar scores but recorded performance scores of 2.75. In the follow-up visit, the U09 owner reported restricted coffee bean supply after a poor harvest, whereas U22 reported having lost its largest reseller. These reported circumstances suggest possible market or supply explanations beyond the three measured conditions. Because the study did not separately model these shocks, they should be interpreted as plausible case-level accounts rather than verified causal mechanisms.

Two other enterprises reached the outcome crossover despite weak recording. U13, a catfish producer in Sukowono with sixteen years in business, reported stable sales through one collector who purchased the full harvest at an agreed price, despite low values on all three pillars. U17, a snack business in Sumberjambe that had operated for three years, reported rapid growth from a relatively low starting level and a moderate PE score. These cases indicate why buyer arrangements and business age deserve attention in subsequent configurational work, but the present data do not establish their statistical role.

U06, a vegetable trader in Kalisat aged twenty-seven, provided a contrast: she was the only case with stronger DM but weak FR and PE. Her TikTok and WhatsApp activity was frequent, and her customer count was high relative to the sample, yet aggregate performance remained below the crossover. Field notes indicated that she could not identify the profitability of individual products. This case is consistent with the interpretation that online visibility does not automatically translate into stronger aggregate performance when product margins remain unclear; it cannot, on its own, establish a general causal explanation.

Configurations for low performance

Two configurations characterized low performance: weak recording with weak production efficiency (~FR*~PE) and weak recording with weak digital marketing (~FR*~DM). Their combined solution consistency was 0.939 and coverage 0.878; the parsimonious solution was ~FR (Table 5). These results illustrate asymmetry: the low-performance pathways were not

simply obtained by reversing the high-performance solution. U12 and U21 had relatively favorable production but low performance and, according to the field notes, set prices by following neighboring businesses rather than using their own cost estimates. The latter observations provide contextual interpretation, not an additional tested condition.

Robustness

Using 90th, 50th, and 10th percentile anchors again produced FR*PE (consistency = 0.898; coverage = 0.852), but the necessity consistency of FR declined to 0.889. Raising the sufficiency thresholds to raw consistency 0.85 and PRI 0.75 left the primary solution unchanged. Removing the ten enterprises with membership exactly 0.501 in at least one condition reduced the analysis to 18 cases and eliminated all enterprises in the FR*PE*~DM row; the solution then became FR*PE*DM (consistency = 0.915; coverage = 0.855), while FR necessity consistency increased to 0.931. Consequently, the observed centrality of FR was comparatively persistent, but its formal necessity classification remained calibration-sensitive. The apparent dispensability of DM depended on a small borderline row, and the sufficiency of FR*PE should be read as reasonably stable only across the explicitly reported specifications.

The initial integrated model and its validation

Drawing on the fsQCA results, the previous gap assessment, and field observations, the team organized twelve draft components into a proposed three-stage sequence (Figure 3). The foundation stage addressed separating household and enterprise cash, costing the main product, and preparing a monthly profit summary. The operations stage addressed layout, batch scheduling, and hygiene requirements; the market stage covered weekly content and buyer-source recording. Two bridging components linked cost estimates with online pricing (C10) and production capacity with promotional decisions (C11). The sequencing itself was designated C12. These stages reflect a proposed order for assistance, not a temporal sequence established by the cross-sectional configuration analysis.

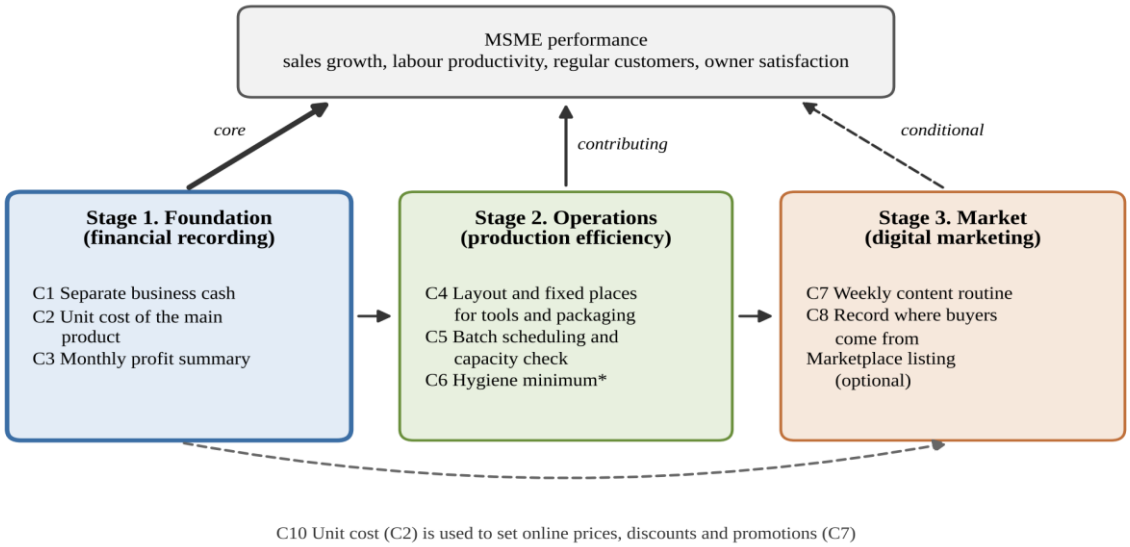

Figure 3. Initial integrated model for strengthening agribusiness MSME performance (after expert review)

Panel judgments are summarized in Table 6. Nine components met the CVR threshold in the first round. The original hygiene checklist (C6, CVR = 0.556) was regarded as unsuitable in its full form for some livestock and fresh produce sellers; after revision to a hygiene minimum targeted to processed food and coffee, it reached 0.778 in a second rating. The capacity check (C11, CVR = 0.333) was merged into batch scheduling (C5), while marketplace listing (C9, CVR = 0.111) was shifted outside the core model as an optional activity. The resulting ten retained or integrated

components had mean CVR 0.867. These judgments support the essentiality of the specified content for the panel, but do not demonstrate feasibility, uptake, or effects on enterprise performance.

Table 6. Content validity ratios of the model components (N = 9)

Code	Component	n_e	CVR	Decision
C1	Separate business cash from household money	9	1.000	Retained
C2	Unit cost (cost of goods produced) for the main product	9	1.000	Retained
C3	Monthly profit summary	8	0.778	Retained
C4	Layout and fixed places for tools and packaging	8	0.778	Retained
C5	Batch scheduling to cut waiting and reheating	8	0.778	Retained (C11 merged)
C6	Basic GMP checklist	7	0.556	Revised to hygiene minimum; 0.778 in round 2
C7	Weekly content routine with prices and ordering details	8	0.778	Retained
C8	Recording where buyers come from	9	1.000	Retained
C9	Marketplace store listing	5	0.111	Moved to optional step
C10	Unit cost used to set online prices and promotions	9	1.000	Retained
C11	Capacity check before a promotion	6	0.333	Merged into C5
C12	Staged sequence: recording, then operations, then market	8	0.778	Retained

Note: n_e = number of panellists rating the component essential. Critical CVR for N = 9 is 0.778 (Ayre & Scally, 2014). Mean CVR of the ten retained components = 0.867.

Discussion

Financial recording emerged as the most consistently positioned managerial condition across the observed pathways, but the finding needs to be interpreted in set-theoretic rather than causal terms. Its necessity consistency was just above 0.90 in the primary specification, and PE came within 0.004 of the same threshold, so a categorical difference between the two would exaggerate the evidence. Still, FR appeared as the core of the high-performance solution and its absence characterized both low-performance solutions, suggesting that records may organize decisions made elsewhere in the enterprise. This account is compatible with the resource-based view, where the usefulness of information depends on its integration into managerial routines rather than its possession alone (Barney, 1991; Kareem et al., 2024; Roffia & Dabić, 2024). Evidence linking financial education with better financial behaviors and firm financial capabilities provides a parallel, although those studies do not establish that bookkeeping is a necessary condition in rural agribusiness (Basha et al., 2023; Kaiser et al., 2022; Siddik et al., 2023). The present contribution is therefore the prominence of recording within these observed configurations, accompanied by an explicit demonstration of calibration sensitivity.

The FR*PE configuration connects cost visibility with operational routines, offering a more specific interpretation than the claim that all aspects of business management improve performance independently. Records can make avoidable loss and unit costs visible, while stable batch scheduling and workplace organization create an opportunity to act on that information. The relationship is consistent with complementarity reasoning: the benefit associated with one practice may depend on another practice being present (Milgrom & Roberts, 1995). Research on manufacturing improvements and agri-food SMEs has emphasized the role of practical routines, organizational capabilities, and resource constraints in adopting more efficient processes (Annosi et al., 2023; Despoudi et al., 2025; Ferrazzi et al., 2025). The evidence here cannot establish which practice was introduced first or whether their combination increased performance after implementation. What it does show is that the observed high-performance solution included recording and efficiency together, which supplies a bounded rationale for testing them jointly in an assistance program.

The absence of DM from the primary high-performance solution should not be interpreted as evidence against digital marketing. Within the initial truth table, enterprises with FR and PE but weak DM formed a small sufficient row, so DM was eliminated during solution minimization. When the borderline cases were removed, that row disappeared and the solution changed to

FR*PE*DM, revealing that the simplified result is contingent on the calibration and cases available. This differs in appearance from studies reporting relationships between digital adoption, marketing capabilities, and stronger SME performance, but those studies typically examine broader samples or different outcomes (Affandi et al., 2024; Amin et al., 2025; Gao et al., 2023; Tajvidi & Karami, 2021; Wu et al., 2024). Research also distinguishes technological access from coordinated digital routines, as in earlier SME marketing studies and reports, and emphasizes organizational readiness as a condition for benefits (Barragan & Becker, 2025; Kallmuenzer et al., 2025; OECD, 2021; Sagala & Őri, 2024; Sulaksono & Zakaria, 2020; Taiminen & Karjaluoto, 2015). A more defensible interpretation is that DM's separate contribution was not resolvable in the observed configurations, particularly among enterprises reliant on established buyers.

The low-performance analysis offers an additional insight because the configurations were not exact opposites of those for high performance. Both pathways contained ~FR, but one paired weak records with weak operations and the other with weak marketing, and the combined solution covered different areas of observed underperformance. This asymmetry is expected in configurational inquiry, which permits different combinations to account for the presence and absence of an outcome (Fiss, 2011; Duan et al., 2022; Nikou et al., 2024). Related work demonstrates how entrepreneurial orientation and financing conditions may be contingent on their accompanying resources rather than acting uniformly across firms (Kusa et al., 2025; Patrício & Ferreira, 2023; Yu et al., 2024). The present analysis therefore challenges a one-size-fits-all interpretation of the three training pillars. However, because only five of eight logically possible configurations were observed, no conclusion can be drawn about the profiles absent from these 28 cases.

Several apparently inconsistent cases help locate the boundary of the proposed explanation. U09 and U22 combined relatively favorable practices with disappointing performance but reported a poor coffee harvest and loss of a major reseller, respectively; U13 reported stable collector sales despite weak management scores. These narratives point to supply shocks, buyer arrangements, and relationships as plausible contextual influences that were not modeled as fsQCA conditions. Reviews of SME growth and studies of supply chain disruptions likewise identify firm age, networking, supply robustness, and market structure as possible components of performance and resilience (Chauhan et al., 2023; Garcia-Martinez et al., 2023; Gurbuz et al., 2023; Nakandala et al., 2025; Ngo, 2022). The observations cannot establish that these external factors caused the measured outcomes, but they caution against treating managerial capability as an exhaustive account. For a later model evaluation, the practical implication is to document market relationships and shocks alongside the three pillars rather than assuming that process training alone can address them.

The expert-practitioner assessment qualified the assistance model by distinguishing generally applicable components from activities that depended on the product and selling arrangement. The hygiene item was narrowed for processed food and coffee, marketplace listing became optional, and a separate capacity check was integrated with scheduling. These revisions are consistent with evidence that SME change programs must fit existing capabilities, channel structures, and implementation constraints instead of following a universal technological prescription (Gonçalves et al., 2024; Held et al., 2026; Martinelli & Tunisini, 2024; Mustapha, 2026; Romero & Mammadov, 2025). The panel results support the content essentiality of ten components under the specified CVR criterion, not the actual sequence's effectiveness. Separating these two kinds of evidence is important: cross-sectional configurations informed the design, while ratings assessed perceived essentiality of proposed components. Only observed implementation could establish whether enterprises follow the sequence and whether subsequent performance changes.

The principal practical implication is to test assistance that begins with separating household and enterprise cash, costing one main product, and using those records in operational and market decisions. A staged approach may reduce the cognitive and time burden of presenting bookkeeping, lean organization, and online promotion as unrelated modules. It would also permit different market activities for enterprises selling to collectors and those serving end consumers, consistent with research on SME marketing-channel transformation and digital orientation (Barragan & Becker, 2025; Martinelli & Tunisini, 2024; Verhoef et al., 2021). Financial information systems, buyer tracing, and operational measurement may reinforce one another, but the present study did not test the size or direction of that reinforcement (Alves & Lourenço, 2022; Lin et al., 2024; Momtaz & Parra, 2025). Thus, the proposed sequence should be presented to district offices and university extension teams as an adaptable prototype, not as an empirically validated performance intervention. A pilot would need to record adherence to each stage and assess outcomes before and after participation to examine its usefulness.

Several limitations constrain the contribution. The purposive sample comprised 28 enterprises, 26 of them microenterprises, and the high correlations among FR, PE, and DM restricted the diversity of observed profiles. The necessity inference crossed the conventional threshold by a narrow margin, and removal of borderline cases altered the DM-related solution, emphasizing the sensitivity of small-sample configurations to calibration choices (Nikou et al., 2024; Pappas & Woodside, 2021). Performance was partly owner-reported, and the second visit and available record checks did not eliminate recall or common-source concerns. The measures did not cover buyer dependence, disruptions, access to finance, enterprise age as an analytic condition, or other factors considered relevant in recent SME scholarship (Basha et al., 2023; Garcia-Martinez et al., 2023; Zhao et al., 2023). Finally, CVR established content judgments only; further work should implement the prototype with the planned five to ten pilot enterprises and examine acceptability, implementation fidelity, and performance over time before wider recommendations are made.

CONCLUSION

Using fsQCA across 28 agribusiness MSMEs in five North Jember subdistricts, this study identified financial recording as a near-necessary condition in the primary calibration and as the core of the observed FR*PE high-performance configuration. The finding was informative but not absolute: the formal necessity classification was calibration-sensitive, and the absence of digital marketing from the primary solution depended on borderline cases. Weak financial recording appeared in both low-performance configurations, while divergent enterprises pointed to buyer relationships and supply disruptions that were not included among the tested conditions. Based on these results, prior diagnostic evidence, and a nine-member expert-practitioner assessment, the team developed a ten-component initial assistance model organized around recording, operations, and market decisions. Its contribution is a context-specific and content-reviewed prototype, not an established causal pathway or tested intervention. A pilot with longitudinal performance assessment is required before claims about the sequence's effectiveness can be supported.

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AUTHOR CONTRIBUTIONS STATEMENT

PPAN and DKW conceived the study and led the writing of the manuscript. PSU, RPYA, and RRLC designed the rubric and supervised data collection in the five districts. AMI developed the production observation sheet. WUAA and PA ran the descriptive and fsQCA analyses. DEP advised on the configurational design, organised the expert panel, and revised the manuscript. All authors read and approved the final manuscript.

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