

Entrepreneurship Competency Model for Coffee Farmers: Construction and Validation

Aji Pamoso^{1*}, Lukman Z. Mohammad², Imanuddin Hasbi³, Nuslih Jamiat⁴

Telkom University, Indonesia^{1,3,4}

Universiti Sultan Zainal Abidin, Malaysia²

Email: humamsiddiq@telkomuniversity.ac.id*, lukmanzm@unisza.edu.my,
imanhasbi@telkomuniversity.ac.id, nuslihjamiat@telkomuniversity.ac.id

ABSTRACT:

This study aims to develop and validate a questionnaire grounded in the Entrepreneurial Competency Model (ECM) to provide a reliable measure of the entrepreneurial competencies of coffee farmers. This study examines the entrepreneurial skills of coffee farmers in Bandung Regency who are members of farming cooperatives. A quantitative approach was employed to collect data from October to December 2024. Results show exploratory Factor Analysis (EFA) was employed to develop the Entrepreneurial Competency Model (ECM) for coffee farmers, identifying five core competency factors: Strategic Thinking, Adaptability, Partnerships, Seizing Opportunities, and Innovation. The EFA produced 27 manifest variables with strong correlations (KMO = 0.939) and a significant Bartlett's test, accounting for 66.64% of the total variance. Strategic competency emphasizes planning, evaluating, and implementing business strategies with a long-term vision. Adaptability reflects openness, flexibility, and networking abilities. Partnership competency highlights collaboration with institutions and the consistent achievement of goals. Opportunity competency captures the ability to identify and leverage business prospects, while Innovation encompasses risk-taking and creative problem-solving. Confirmatory Factor Analysis (CFA) validated the model, demonstrating satisfactory reliability (Cronbach's alpha > 0.7 and Average Variance Extracted [AVE] > 0.5) as well as discriminant validity. The Entrepreneurial Competency Model (ECM) for Bandung coffee farmers encompasses five key competencies: strategic, adaptability, partnerships, opportunity, and innovation, that collectively enhance competitiveness, sustainability, and development. It provides a practical framework to guide decision-making, foster innovation, and support long-term growth in smallholder coffee farming.

Keyword: Entrepreneurship, Competency Model, Coffee Farmers

INTRODUCTION

Agricultural entrepreneurship represents a vital yet complex domain. It is predominantly characterized by family-owned enterprises focused on production, and its development is influenced by protective policies as well as the open exchange of knowledge (Lans et al., 2014). In modern agriculture, farmers function as both producers and entrepreneurs, managing complex systems and relationships (FAO, 2024).

In Bandung Regency, small-scale coffee farmers rely on traditional cultivation practices to sustain their livelihoods and preserve local culture. However, they continue to face challenges, including low product quality, limited capital, dependence on traditional techniques, lack of partnerships, insufficient innovation, and inadequate supporting facilities (Mr. Aleh, 2024). Although farmers play a crucial role in the coffee industry, their bargaining power remains weak compared to that of middlemen and exporters (Al Mamun, 2019).

Coffee farmers have the potential to become drivers of local entrepreneurship, supporting the global economy through technology, innovation, and capital mobilization (Nabiswa & Mukwa, 2017). The success of farming depends on the decisions made by farmers (Al Mamun, 2019). To adapt and enhance their competitiveness, farmers need entrepreneurial competencies in production, marketing, finance, and partnerships (Nieuwoudt, 2017).

Entrepreneurial competence encompasses the ability to identify opportunities, build relationships, manage risks, develop organizational skills, access information, demonstrate commitment, and formulate strategies (Iskandar, 2021). Koçyiğit (Koçyiğit, 2024), entrepreneurial competence is a critical factor in achieving entrepreneurial success. According to Aidara (Aidara, 2021), entrepreneurial competence encompasses knowledge, motivation, attitude, self-image, social role, and skills. Lans et al (Lans et al., 2014) categorize entrepreneurial competence into three dimensions: analysis, networking, and initiative.

Entrepreneurial skills are essential for ensuring the sustainability, growth, and success of businesses (Egbetade et al., 2024). Entrepreneurial competence comprises both inherent and acquired elements, including attitudes, characteristics, self-image, skills, knowledge, and work experience (Sakib, 2022). According to Lans (Lans et al., 2014), not all small-scale agricultural entrepreneurs possess strong entrepreneurial characteristics, highlighting the need for a contextual approach tailored to their specific needs.

Several studies have highlighted the importance of entrepreneurial competence in agricultural contexts, yet contextual adaptation remains limited. Lans et al. (2014) proposed a three-dimensional entrepreneurial competence framework—analytical, networking, and initiative—which significantly influenced entrepreneurial behavior among small business owners, including farmers. However, their model was developed in European settings, overlooking the socio-cultural and structural conditions of smallholders in developing countries such as Indonesia. Similarly, Sakib et al. (2022) empirically confirmed that entrepreneurial competence enhances SME performance in Bangladesh, but their research emphasized general business enterprises, not agricultural entrepreneurs facing fluctuating commodity prices and resource constraints. These studies collectively underscore that while entrepreneurial competence contributes to performance, sectoral and local contextualization is often missing. This study fills that gap by developing and validating a localized Entrepreneurial Competency Model (ECM) tailored to coffee farmers in Bandung Regency, integrating Lans et al.'s (2014) theoretical dimensions and operationalizing them using Man et al.'s (2002) and Aidara et al.'s (2021) refined instruments.

In this context, the present study aims to develop and validate an Entrepreneurial Competency Model (ECM) for coffee farmers in Bandung Regency, adapting the competency frameworks proposed by Lans (Lans et al., 2014) and following Nazmus Sakib (Sakib, 2022), the study aims to produce a model that is contextual, applicable, and relevant to the social, economic, and cultural conditions of rural coffee farmers. In addition, the measurement of farmers' entrepreneurial competence employs an instrument originally developed by Man et al (Man et al., 2002) and subsequently refined by Khanam (Khanam, 2020) and Aidara (Aidara, 2021)

METHOD

This study focuses on coffee farmers who are members of farming cooperatives in Bandung Regency. Data were collected between October and December 2024 (Pamoso, 2025) using a quantitative approach.

Entrepreneurial competencies from Lans (Lans et al., 2014) were adapted to develop indicators relevant to coffee farmers in Bandung Regency. These indicators include opportunity identification, opportunity utilization, and networking, which involves building relationships with stakeholders, understanding the needs of others, and leveraging external ideas to support business development. Additional adaptations were made based on the work of Khanam (Khanam, 2020), Md. Nazmus Sakib (Sakib, 2022), Yusuf Iskandar (Iskandar, 2021), Lans (Lans et al., 2014), and Simone Nieuwoudt (Nieuwoudt, 2017), concerning the domains of entrepreneurial competencies.

A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was employed to assess the farmers' ability to demonstrate these indicators. Furthermore, interviews with coffee stakeholders in Bandung Regency were conducted to refine the manifest variables and adjust the questionnaire (Pamoso, 2025). Validity testing and Cronbach's alpha were used to evaluate the reliability of the scale (Huong, 2024). Thirty coffee farmers participated in this stage, resulting in 27 valid and reliable manifest items.

Data were analyzed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), both of which require large samples relative to the number of observed variables (Hair et al., 2019). The minimum participant-to-item ratio is 10:1 (Stefana et al., 2024). Accordingly, this study employed 27 manifest variable items with a minimum sample of 300 coffee farmers, selected through purposive sampling.

Phase 1: Development of Entrepreneurial Competency Model (ECM)

The Entrepreneurial Competency Model (ECM) for coffee farmers in Bandung Regency was developed using Exploratory Factor Analysis (EFA), following a literature review and preliminary exploration. EFA is a method used to reveal the factor structure within an instrument (Stefana et al., 2024). This approach identifies latent factors that explain variation among variables (Huong, 2024).

The suitability of the data for factor analysis was evaluated using Bartlett's test of sphericity ($p \leq 0.05$) and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy ($KMO \geq 0.60$) (Shrestha, 2021). Indicators with an MSA value below 0.50 were considered unsuitable. Factors were then extracted using Principal Component Analysis (PCA) with eigenvalues greater than 1 (Hair et al., 2019). Factor rotation can be either orthogonal or oblique, with Varimax being the most commonly used orthogonal rotation method (Akhtar-Danesh, 2017).

Phase 2: Validation of the ECM

The extracted factor model was tested using confirmatory factor analysis (CFA) with the unweighted least squares method and direct oblimin rotation. Model fit was assessed using the Incremental Fit Index (IFI) and Comparative Fit Index (CFI) (Liu, 2024). Model adequacy was

determined based on indicator scores and considered acceptable if the following thresholds were met: NFI, IFI, and TLI ≥ 0.90 ; RMR ≤ 0.10 ; RMSEA ≤ 0.08 ; and GFI, AGFI, and CFI > 0.90 (Hair et al., 2019). External validity was assessed using the Composite Reliability Index (CRI ≥ 0.70) and Average Variance Extracted (AVE ≥ 0.50). Discriminant validity was confirmed when the square root of a variable's AVE exceeded its correlations with other variables (Liu, 2024).

RESULTS AND DISCUSSION

Sample Characteristics

Most coffee farmers in Bandung Regency are male (70%), aged 36–45 years (32%), and have completed junior secondary education (37%). Approximately 75% rely on coffee as their primary source of income. The most common landholding size is 1,000–3,000 m² (57.7%), with 53.7% cultivating institutional land as tenants. The Ateng variety is the most widely grown (42%) due to its productivity and adaptability. Most farmers have 21–30 years of farming experience, indicating that coffee cultivation is largely inherited across generations.

Phase 1: Development of Entrepreneurial Competency Model (ECM)

The initial stage of model development using exploratory factor analysis (EFA) produced 27 variables from 27 highly correlated items for further analysis. Suitability tests confirmed the adequacy of the data (KMO = 0.939; Bartlett's test, $p < 0.05$; all MSA > 0.5). Based on eigenvalues greater than 1, five dominant factors were extracted, explaining 66.637% of the total variance (Pamoso, 2025). Using Varimax rotation, variables with loadings greater than 0.50 were considered dominant, resulting in five clearly interpretable factors (Table 1).

Factor 1: Strategic

This factor encompasses marketing strategies, awareness of business strengths and weaknesses, opportunity utilization, long-term vision, relationships with private institutions, and responsiveness to market trends.

Factor 2: Adaptability

This factor reflects farmers' ability to remain open-minded and adaptive, as well as to build social networks both digitally and in person.

Factor 3: Partnership

This factor highlights farmers' engagement with institutions and their consistency in achieving business goals to support the implementation of business ideas.

Factor 4: Opportunity

This factor emphasizes the importance of planning and the ability to transform opportunities into viable enterprises that contribute to coffee development.

Factor 5: Innovation

This factor underscores innovation and farmers’ courage in taking risks, experimenting with new approaches, and being receptive to external ideas.

Table 1. Rotated Factor Solution: Underlying Items and Factor Loadings (N = 300)

Factor	Sub-constructs	Description	Factor Loading
Strategic	X1	Marketing strategy (STRA)	0.839
	X2	Awareness of strengths (STRA)	0.816
	X3	Awareness of weaknesses (STRA)	0.815
	X4	Opportunity utilization (OPP)	0.778
	X5	Addressing key coffee issues (STRA)	0.773
	X6	Long-term vision (STRA)	0.76
	X7	Relationships with private institutions (REL)	0.706
	X8	Innovation in superior seedlings (LEN)	0.691
	X9	Understanding market trends (LEN)	0.622
	X10	Knowledge of cultivation innovations (LEN)	0.619
	X11	Family role in farming (REL)	0.523
Adaptability	X21	Openness to criticism (REL)	0.717
	X22	Ease of adaptation (REL)	0.68
	X23	Digital marketing & e-commerce (STRA)	0.644
	X24	Communication approach (REL)	0.636
	X25	Ability to utilize criticism (LEN)	0.625
	X26	Networking with local coffee farmers (REL)	0.582
	X27	Networking with farmers from other regions (REL)	0.579
Partnership	X17	Relationship with government (REL)	0.818
	X18	Relationship with universities (REL)	0.798

Factor	Sub-constructs	Description	Factor Loading
Opportunity	X19	Staying focused on business goals (STRA)	0.738
	X20	Implementing business ideas (OPP)	0.705
	X15	Business planning (OPP)	0.8
	X16	Transforming opportunities (OPP)	0.791
Innovation	X12	Risk-taking (INN)	0.817
	X13	Experimenting with new approaches (OPP)	0.544
	X14	Openness to others' ideas (REL)	0.426

Source: Pamoso (2025) [28]

Phase 2: Validation of the ECM

Confirmatory Factor Analysis

The results reveal five main factors in the Entrepreneurial Competency Model: strategic thinking, adaptability, partnership skills, initiative, and innovation. All indicators were validated, with outer loadings exceeding 0.60

Table 2. Results of Factor Loadings from Cfa (N = 300)

Factor	Sub-constructs	Description	Factor Loading
Strategic	X1	Marketing strategy (STRA)	0.733
	X2	Awareness of strengths (STRA)	0.704
	X3	Awareness of weaknesses (STRA)	0.736
	X4	Opportunity utilisation (OPP)	0.743
	X5	Addressing key coffee issues (STRA)	0.707
	X6	Long-term vision (STRA)	0.757
	X7	Relationships with private institutions (REL)	0.747
	X8	Innovation in superior seedlings (LEN)	0.723
	X9	Understanding market trends (LEN)	0.742
	X10	Knowledge of cultivation innovations (LEN)	0.711
	X11	Family role in farming (REL)	0.703
Adaptability	X21	Openness to criticism (REL)	0.804
	X22	Ease of adaptation (REL)	0.789
	X23	Digital marketing & e-commerce (STRA)	0.783
	X24	Communication approach (REL)	0.796
	X25	Ability to utilise criticism (LEN)	0.710
	X26	Networking with local coffee farmers (REL)	0.784
Partnership	X27	Networking with farmers from other regions (REL)	0.771
	X17	Relationship with government (REL)	0.775
	X18	Relationship with universities (REL)	0.863
	X19	Staying focused on business goals (STRA)	0.859

Factor	Sub-constructs	Description	Factor Loading
Opportunity	X20	Implementing business ideas (OPP)	0.725
	X15	Business planning (OPP)	0.710
	X16	Transforming opportunities (OPP)	0.810
Innovation	X12	Risk-taking (INN)	0.750
	X13	Experimenting with new approaches (OPP)	0.825
	X14	Openness to others' ideas (REL)	0.826

The results of the model goodness-of-fit test are presented in Table 3.

Table 3. Goodness-of-Fit (Gof) Results for the Entrepreneurial Competency Model

No	Eligibility Criteria	Cut off Value	Test Results	Description
1	Chi Square	Expected small	895.81	Marginal Fit
2	GFI	>0,90	0.816	Marginal Fit
3	RMSEA	≤0,08	0.079	Fit
4	CFI	>0,90	0.866	Marginal Fit
5	TLI	>0,90	0.849	Marginal Fit
6	PNFI	>0,90	0.718	Marginal Fit
7	AGFI	>0,90	0.777	Marginal Fit

Although most indices indicated a marginal fit, the RMSEA met the required criteria, suggesting that the model can be considered acceptable.

Reliability of the ECM-SET and External Validity

Table 4 shows that all constructs are valid and reliable, with AVE > 0.5 and both Cronbach's Alpha and Composite Reliability > 0.7.

Table 4. Results of Reliability and Convergent Validity

Construct	Sub-constructs	AVE	Cronbach's Alpha	Composite Reliability
Strategic (STRA)	STRA1 - STRA11	0.53	0.911	0.925
Adaptability (ADP)	ADP1 - ADP7	0.604	0.891	0.914
Partnership (PRT)	PR1 - PR4	0.652	0.82	0.882
Opportunity (OPP)	OPP1 - OPP2	0.87	0.851	0.931
Innovation (INN)	INN1 - INN3	0.678	0.763	0.863

Discriminant Validity

Table 5 confirms the discriminant validity of the model, as the square root of the Average Variance Extracted (AVE) for each variable exceeds its correlations with the other variables.

Table 5. The Results of the Discriminant Validity

Construct	Adaptability	Innovation	Partnership	Opportunity	Strategic
Adaptability	0.777				
Innovation	0.784	0.823			

Partnership	0.84	0.754	0.807		
Opportunity	0.732	0.709	0.753	0.933	
Strategic	0.819	0.795	0.807	0.742	0.728

The Entrepreneurial Competency Model (ECM) has been shown to be consistent, valid, and reliable. It is particularly relevant for coffee farmers, as it accurately reflects real-world conditions and addresses the limitations of previous competency models.

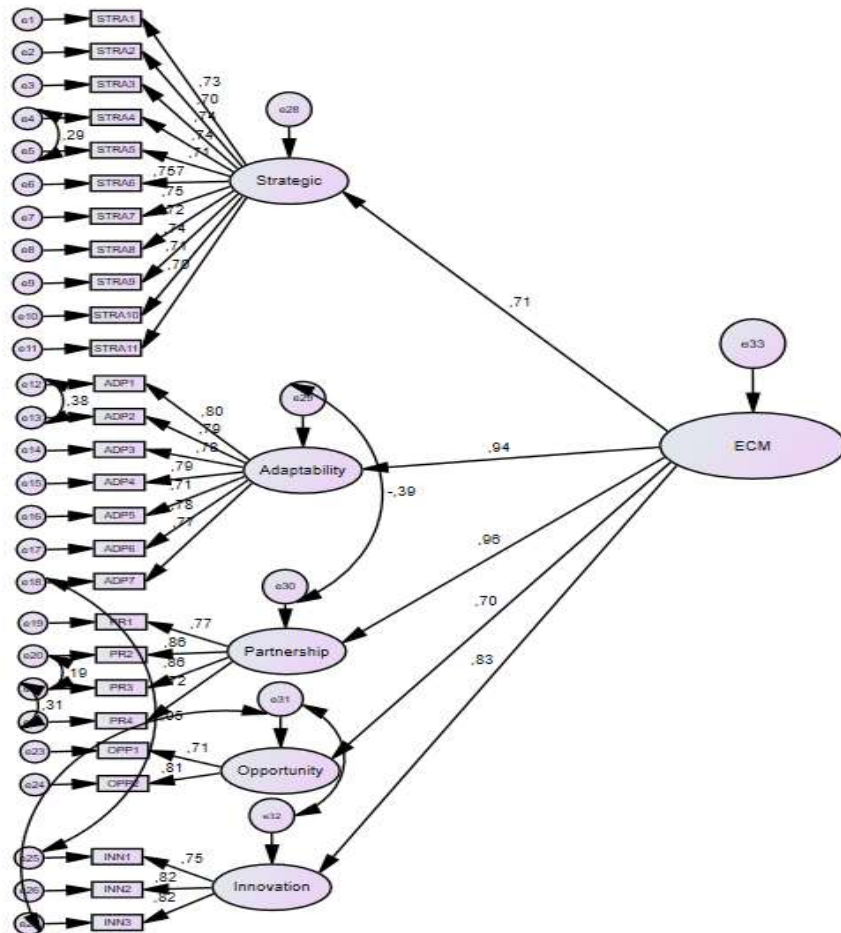


Figure 1. Visual Framework Of The Entrepreneurial Competency Model (ECM) For Coffee Farmers

This section discusses the findings, limitations, and recommendations for future research. Based on a literature review, document analysis, and interviews with coffee farmers, the first research question identified five main constructs and 27 sub-constructs: strategic competence, adaptability, partnership, opportunity, and innovation. The second research question revealed that the constructs within the Entrepreneurial Competency Model operate both independently and interdependently, forming an integrated system in the practical context of coffee farming.

Strategic Competence

This competence reflects an entrepreneur's ability to formulate, evaluate, and implement business strategies. In the context of coffee farming, it is demonstrated through continuous planning, assessment, and adjustment of strategies. Farmers demonstrate this competence by having a clear five-year vision for their business, recognizing their strengths and weaknesses, identifying opportunities and the factors that create them, and possessing in-depth insight into key issues in coffee farming. These findings align with Md. Nazmus (Sakib, 2022), who states that strategic competence enables individuals and organizations to compete and sustain growth in dynamic business environments (Iskandar, 2021).

Adaptability Competence

This competence involves the ability to adapt, remain focused on goals amid change, actively seek updated information related to coffee farming, and develop business plans to guide operations in a structured and measurable way. An entrepreneur's ability to adapt is a valuable internal resource that is difficult to imitate, thereby creating a competitive advantage. Furthermore, organizations must adjust to rapid environmental and technological changes to maintain their competitiveness (Rahab, 2016).

Partnership Competence

This competence involves building trust with various stakeholders through collaboration with government agencies, universities, and private extension services, as well as engaging experienced family members in coffee farming. According to Md. Nazmus (2022) (Sakib, 2022), partnership competence is an entrepreneur's ability to establish trusted networks and manage resources, which is crucial for small businesses to meet their needs, enhance communication, and foster collaboration. Lans (Lans et al., 2014) further notes that one aspect of networking competence involves establishing inter-organizational partnerships.

Opportunity Competence

This refers to an entrepreneur's ability to recognize and exploit opportunities by understanding the factors that support or inhibit them and transforming them into viable businesses. According to Md. Nazmus (Sakib, 2022), opportunity competence involves the ability to identify, develop, and evaluate market opportunities using various methods. Lans further explains that it includes analyzing situations, predicting trends, and demonstrating a proactive, initiative-driven attitude in discovering new opportunities and managing ongoing business operations (Lans et al., 2014).

Innovation Competence

This competence encompasses farmers' willingness to take risks, experiment with new approaches, and be receptive to feedback, thereby fostering creativity and entrepreneurial courage in coffee farming. According to Lans (Lans et al., 2014), the initial stage of entrepreneurship

involves idea formulation, opportunity identification, and the development of initial plans, reflecting initiative, courage, and readiness to face risks.

Strategic competence is the primary foundation of coffee farmers' entrepreneurship, supporting planning, management, decision-making, resource utilization, and market adaptation. It also provides a basis for the development of other competencies, such as adaptability, innovation, and partnership. Figure 1 presents a clear visualization of the model. The conceptual ECM model is limited because the data were collected solely from coffee farmers in Bandung Regency, focusing only on the entrepreneurial competencies of business actors. The instrument is not yet universal, and the analysis does not account for control variables such as gender, land size, experience, and education.

CONCLUSION

The results show that the Entrepreneurial Competency Model (ECM) for coffee farmers in Bandung Regency comprises five key competencies—strategic thinking, adaptability, partnership development, opportunity recognition, and innovation—that collectively enhance the competitiveness and sustainability of coffee enterprises. Strategic thinking guides planning and direction; adaptability enables flexible responses to change; partnership development emphasizes stakeholder networking; opportunity recognition involves identifying and exploiting business opportunities; and innovation reflects risk-taking and breakthroughs. Together, these dimensions form a solid foundation for the development of farmer-level coffee enterprises. For future research, longitudinal studies could examine how these competencies evolve over time and their direct impact on farm performance, as well as explore context-specific training interventions to strengthen each dimension.

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