

SME Readiness for Bank Financing: A Cluster Analysis of Financial Reporting Quality and Accounting Literacy

Badria Muntashofi¹, Asep Kurniawan², Heraeni Tanuatmodjo³

^{1,2,3}Accounting Education, Universitas Pendidikan Indonesia, Indonesia
badria@upi.edu

Article Info

Article history:

Received September 10, 2026
Revised September 23, 2026
Accepted September 24, 2026
Published October 15, 2026

ABSTRACT

Access to formal bank financing among Indonesian SMEs remained limited, partly attributable to weak financial statement quality and low accounting literacy among business owners. Prior studies had generally tested the effects of these two factors in a linear, aggregate manner (a variable-centered approach), without describing how SMEs were actually distributed across combinations of readiness levels. This study aimed to identify SME readiness profiles based on financial statement quality and accounting literacy, and to examine differences in bank-SME partnership and financing access across the resulting groups. Using a cross-sectional survey of 200 SMEs in West Java, Indonesia that had applied for bank credit within the past three years, K-Means cluster analysis was applied to financial statement quality and accounting literacy scores, yielding three readiness groups: Low ($n=39$; 19.5%), Moderate ($n=86$; 43.0%), and High ($n=75$; 37.5%). One-way ANOVA revealed significant differences ($p<.001$) in bank-SME partnership and financing access across the three groups, with large effect sizes ($\eta^2 = .70$ and $.71$). Tukey HSD post-hoc tests confirmed that all pairwise group comparisons were statistically significant, indicating a consistent, graded pattern—rather than a mismatched configuration—between SME reporting-literacy readiness and financing outcomes. These findings suggested that improvements in SME readiness were gradual and holistic in nature, implying that policy interventions should be tiered according to readiness group rather than applied uniformly across all SMEs.

Keywords: Accounting Literacy; Bank-SME Partnership; Cluster Analysis; Financial Reporting Quality; SME Financing.

INTRODUCTION

Micro, small, and medium enterprises (SMEs) constitute the backbone of the Indonesian economy, contributing approximately 61% of national Gross Domestic Product (GDP) and absorbing 97% of the workforce [1]. Nevertheless, the SME financing gap was estimated at IDR 1,650 trillion, and only around 5% of SMEs had access to formal bank financing [2]. One issue associated with this limited access was the weak quality of financial statements and accounting literacy among SME owners, which could make it difficult for banks to assess the creditworthiness of prospective borrowers [3].

From the Resource-Based View perspective, financial statement quality and accounting literacy could be regarded as internal resources that supported SMEs' capacity to produce and use accounting information to convince external parties [4]. Good financial statement quality, including compliance with the Financial Accounting Standards for Micro, Small, and Medium Entities (SAK EMKM), was associated with better credit assessments among Indonesian SMEs [5]. From the Agency Theory perspective, the relationship between SMEs as agents and banks as principals involved information asymmetry. High-quality financial statements could help reduce this asymmetry, enabling banks to assess the credit risk of prospective borrowers more easily [6]. Research on small-business financing also demonstrated the importance of mechanisms for reducing information asymmetry between borrowers and financial institutions [7], [8].

Accounting literacy was an important capacity in SMEs' accounting information processes. It encompassed knowledge, skills, and attitudes toward financial management and bookkeeping [9]. In practice, SME bookkeeping in West Java still faced systematic limitations [10], and low accounting literacy contributed to weak financial reporting quality [11], [12]. Thus, financial statement quality and accounting literacy were not merely administrative characteristics but also formed part of the accounting-information readiness that SMEs could use when interacting with financing institutions.

This relationship was also associated with bank-SME partnerships. Financial-sector partnerships with SMEs were aligned with Sustainable Development Goal (SDG) 17 concerning stronger partnerships and the mobilization of financial resources [13]. In the same research dataset, previous research found that accounting literacy affected financing access through bank-SME partnerships, whereas financial statement quality did not show a significant direct effect. This finding indicated that the relationship between SMEs' internal capacities and financing could involve interaction mechanisms with banks.

Various previous studies had examined the effects of financial statement quality and accounting literacy on SME financing access using a variable-centered approach, namely regression models or structural equation modeling that assumed linear and uniform relationships across the SME population [10]. This approach was informative for determining the direction and average strength of relationships among variables, but it did not describe how SMEs were actually grouped according to combinations of characteristics. From a policy perspective, information about which SME groups most needed particular interventions was more actionable than average effect coefficients alone.

This study formed part of a series of research funded by Universitas Pendidikan Indonesia (Contract No. 926/UN40.F7/PT.01.01/2026) using the same survey data as previous research. The previous study, using a variable-centered approach, found that accounting literacy significantly affected SME financing access through the mediation of bank-SME partnerships, while financial statement quality did not show a significant direct effect. To complement that finding from a different perspective, this study used a person-centered approach through cluster analysis to identify how 200 SMEs in West Java were distributed according to combinations of

financial statement quality and accounting literacy, and to examine whether the resulting groups differed significantly in bank-SME partnerships and financing access.

Based on this background, the research questions were: (1) What were the SME readiness profiles in West Java based on the combination of financial statement quality and accounting literacy? (2) Were there differences in the level of bank-SME partnerships across readiness groups? (3) Were there differences in financing access across readiness groups? This study aimed to answer these three questions while providing more targeted policy implications than a purely variable-centered approach, in line with the partnership agenda of Sustainable Development Goal (SDG) 17, particularly Target 17.3 concerning the mobilization of additional financial resources for developing countries [13].

The novelty of this study lay in applying K-Means cluster analysis to Indonesian SME survey data on financial statement quality and accounting literacy—an approach that was relatively uncommon in the domestic SME accounting literature, which was generally based on regression or structural equation modeling [5]. This approach provided a richer picture of population heterogeneity to support tiered policy intervention design. The novelty also complemented previous research concerning the role of SME owners' cognitive biases in financial decision-making [19] by showing that SMEs' administrative-financial readiness also followed a graded pattern, rather than being explained solely by individual biases.

METHOD

Research Design, Population, and Sample

This study used a quantitative approach with a cross-sectional survey design. The study population consisted of SMEs in West Java Province that had applied for bank credit within the previous three years (2023–2025). Purposive sampling was used with the following criteria: the SME had operated for at least three years, had applied for bank credit at least once during the previous three years, had at least three employees, and the owner/manager was willing to participate. The sample size was determined using Slovin's formula with a 7% margin of error, resulting in a minimum of 200 respondents. A total of 200 complete and valid responses were obtained through a combination of online (Google Forms) and offline (paper-based) questionnaires, distributed proportionally across four business sectors: trade (35%), services (30%), manufacturing (25%), and agriculture/livestock (10%). All instruments underwent expert validation by three academics and two banking practitioners, followed by pilot testing with 30 SMEs before the main data collection.

Variable Measurement

Financial statement quality (X1) was measured using 16 items covering completeness, timeliness, accuracy, and compliance with SAK EMKM. Accounting literacy (X2) was measured using 15 items covering knowledge, skills, and attitudes toward bookkeeping. Bank-SME partnership (M) was measured using 11 items

covering participation in bank assistance programs, technical assistance in preparing credit proposals, and the frequency/quality of communication with account officers. SME financing access (Y) was measured using 10 items covering credit approval status, the adequacy of the credit amount relative to needs, and the ease of credit requirements. All items used a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Item-total correlation testing showed that all 52 items across the four constructs were valid ($r > 0.30$), while Cronbach's Alpha testing indicated very high internal consistency for all constructs ($X1 = 0.964$; $X2 = 0.969$; $M = 0.975$; $Y = 0.973$). Given the exceptionally high reliability coefficients and the very high inter-construct correlations ($r = 0.82-0.93$), the potential for common method bias (CMB) was formally assessed using Harman's single-factor test. All 52 items across the four constructs were entered into an unrotated principal component analysis; a single factor accounted for 67.10% of the total variance, exceeding the conventional 50% threshold used to flag CMB as a concern, although three factors emerged with eigenvalues greater than 1 rather than a single dominant factor. These results indicate that common method bias cannot be fully ruled out and are treated as a limitation of this study (see Discussion)[21].

Data Analysis

The data were analyzed in several stages using Python (pandas, scikit-learn, scipy, and statsmodels) at a 5% significance level. First, a composite score for each respondent was calculated as the mean of all items for each construct (X1, X2, M, and Y). Second, X1 and X2 scores were standardized (z-scores) and used as the basis for grouping through the K-Means algorithm. K-Means clustering was implemented in Python's scikit-learn library with the following hyperparameters: initialization method = k-means++, number of independent initializations (n_init) = 20, maximum iterations per run (max_iter) = 300 (library default), and a fixed random seed (random_state = 42) to ensure full reproducibility of the reported solution. The optimal number of clusters was determined by comparing silhouette coefficients for $k=2$ to $k=5$, while also considering interpretability and consistency with the three-level categorization scheme (low/medium/high) used during the initial data-processing stage. Third, differences in M and Y across clusters were tested using one-way Analysis of Variance (ANOVA), preceded by tests of variance homogeneity (Levene) and normality (Shapiro-Wilk). Effect sizes were calculated using eta-squared (η^2). Tukey Honestly Significant Difference (HSD) post-hoc tests were conducted to identify pairs of groups that differed significantly.

RESULTS AND DISCUSSION

Descriptive Statistics

Overall ($n=200$), the mean item scores for the four constructs were in the moderate category: $X1 = 3.02$; $X2 = 3.02$; $M = 3.01$; and $Y = 2.99$ (on a 1–5 scale), indicating that respondents' financial statement quality, accounting literacy, bank-SME partnerships, and SME financing access were generally not yet optimal.

Determination of the Number of Clusters

Table 1 presents the silhouette coefficients for several alternative numbers of clusters (k) based on standardized X1 and X2 scores.

Table 1. Silhouette Coefficients for Different Numbers of Clusters

Number of Clusters (k)	Silhouette Coefficient
2	0.491
3	0.460
4	0.418
5	0.411

As an additional validation, the elbow method (decrease in within-cluster sum of squares/WCSS) was also examined, as presented in Table 2.

Table 2. WCSS Decrease (Elbow Method) for Different Numbers of Clusters

Number of Clusters (k)	WCSS (Inertia)	Decrease in WCSS
1	400.00	—
2	156.10	243.90
3	85.60	70.50
4	59.40	26.20
5	44.56	14.83

The sharpest decrease in WCSS occurred from k=2 to k=3 (a decrease of 70.50), followed by a substantial flattening after k=3 (26.20 and 14.83), indicating that the elbow point was at k=3. This finding reinforced the selection of k=3: although the silhouette coefficient for k=2 was slightly higher (0.491 versus 0.460), the difference was relatively small, whereas the elbow method independently confirmed k=3 as the solution that most efficiently balanced model simplicity and data-variance explanation. The k=3 solution also provided a more informative resolution for policy targeting (low, moderate, high) and was consistent with the three-level categorization scheme used during the initial descriptive analysis.

Profiles of the Three SME Readiness Groups

The K-Means cluster analysis (k=3) produced three SME readiness groups based on the combination of financial statement quality and accounting literacy, as presented in Table 3.

Table 3. Descriptive Profiles of the Three SME Readiness Groups (1–5 Scale)

Group	n (%)	X1 Mean (SD)	X2 Mean (SD)	M Mean (SD)	Y Mean (SD)
Low	39 (19.5%)	1.90 (0.42)	1.84 (0.41)	1.88 (0.48)	1.83 (0.47)
Moderate	86 (43.0%)	2.89 (0.33)	2.86 (0.29)	2.86 (0.42)	2.83 (0.44)
High	75 (37.5%)	3.74 (0.39)	3.82 (0.40)	3.78 (0.48)	3.77 (0.48)

The Low group (19.5% of the sample) showed mean scores below 2.0 across all constructs, indicating SMEs with very limited financial reporting, limited accounting literacy, weak bank partnerships, and the lowest financing access. The corresponding intervention implications are addressed in the Discussion. The

Moderate group (43.0%), the largest group, showed scores around the midpoint of the scale across all constructs. The High group (37.5%) showed scores above 3.7 across all constructs, indicating SMEs with good administrative-financial readiness accompanied by high levels of bank partnership and financing access.

Notably, X1 and X2 scores in each group moved in the same direction and were close to each other (for example, in the Low group, X1 = 1.90 and X2 = 1.84), with no group displaying an imbalanced profile such as high literacy but low financial statement quality, or vice versa. This pattern was consistent with the very high X1-X2 correlation ($r = 0.89$) identified in the initial data processing.

Differences in Bank-SME Partnerships and Financing Access Across Groups

Before the ANOVA, Levene's test indicated homogeneous variances for M and Y across the three groups (Levene M: $F=0.41$, $p=0.662$; Levene Y: $F=0.42$, $p=0.659$). The Shapiro-Wilk normality test showed that Y was normally distributed ($p=0.110$), whereas M showed a slight deviation from normality ($p=0.046$). Given the relatively large sample size in each group ($n \geq 39$) and the robustness of ANOVA to mild departures from normality, the ANOVA was continued.

Table 4. One-Way ANOVA Results Across the Three Readiness Groups

Variable	F	p-value	η^2 (eta-squared)	Effect Size Category
Bank-SME Partnership (M)	230.96	<0.001	0.701	Large
Financing Access (Y)	236.56	<0.001	0.706	Large

The ANOVA results showed highly significant differences in bank-SME partnerships and financing access across the three readiness groups ($p < 0.001$), with large effect sizes ($\eta^2 > 0.70$ for both), meaning that more than 70% of the variance in bank partnerships and SME financing access was explained by readiness-group membership. The Tukey HSD post-hoc test (Table 5) confirmed that all pairs of groups differed significantly ($p < 0.001$) for both M and Y, with a pattern of increasing differences from Low to Moderate to High.

Table 5. Tukey HSD Post-Hoc Test Results

Group Pair	Mean Difference M	Mean Difference Y	Significance
Low vs. Moderate	0.974	0.993	$p < 0.001$
Low vs. High	1.895	1.940	$p < 0.001$
Moderate vs. High	0.921	0.947	$p < 0.001$

Discussion

The main finding of this study was that SMEs in West Java were not divided into qualitatively different readiness configurations (e.g., high literacy-low reporting), but were distributed in graded levels along the same administrative-financial readiness spectrum, from Low to High. This pattern differed from the

expectation in many person-centered studies that emphasizes the importance of different configurations (typological diversity) across groups. The absence of imbalanced patterns was consistent with the high correlation between financial statement quality and accounting literacy ($r=0.89$) identified during the initial data processing.

The practical implication was that SME capacity-building programs did not need to separate accounting literacy training and financial-reporting assistance too rigidly, because the two capabilities tended to develop together in this population. Integrated programs were likely to be more efficient than two separate programs. The finding that bank-SME partnerships and financing access increased consistently and significantly with higher readiness groups was consistent, from a person-centered perspective, with the previous finding using the same data that accounting literacy promoted bank partnerships, which in turn increased financing access. However, this study showed that the pattern applied consistently across the readiness spectrum rather than only to a particular group, thereby strengthening the generalizability of the finding in the West Java SME context.

The Low group, comprising nearly one-fifth of the sample (19.5%), was the group most vulnerable to financial exclusion because it had the weakest bank partnerships and the lowest financing access. This group should be a primary target for intensive assistance by banks and local governments, because without targeted intervention, the readiness gap between this group and the Moderate and High groups could widen. A concrete, tailored intervention for this group could combine accounting-literacy training and financial-reporting assistance into a single, sequenced program rather than two separate offerings, consistent with the graded (non-mismatched) readiness pattern identified above. As an indicative (not data-derived) design, such a joint program could include: (a) a short, hands-on bookkeeping module built around the SME's own transaction records rather than generic case studies, co-delivered by a bank account officer and an accounting facilitator; (b) a simplified SAK EMKM reporting template completed in guided, milestone-based stages over an illustrative 8–12-week period; (c) a direct pathway into subsidized government credit schemes (e.g., Kredit Usaha Rakyat/KUR) upon completion, so that improved readiness translates immediately into a financing opportunity rather than a credential with no follow-through; and (d) periodic reassessment (e.g., at an indicative six-month interval) to track whether Low-group SMEs migrate into the Moderate or High readiness group, which would also generate the longitudinal evidence called for below. Embedding bank personnel directly into the literacy-building process, rather than treating training and lending as sequential and separate activities, is consistent with this study's finding that reporting readiness and partnership quality move together rather than independently, though this proposed mechanism itself was not directly tested and warrants future evaluation.

Several limitations should be acknowledged. First, the very high correlations among variables ($r=0.82$ – 0.93) and Cronbach's Alpha values above 0.95 across all constructs indicated the possibility of common method bias or conceptual overlap among items, given that all variables were measured through SME owners'

perceptions at a single point in time using the same instrument. a concern the Harman's single-factor test reported above (67.10% variance on one factor) was unable to rule out. Future research should use more diverse data sources (e.g., bank credit transaction data) to strengthen the validity of the findings. Second, although the Shapiro-Wilk test showed a slight deviation from normality for M, variance homogeneity across groups was satisfied, so the ANOVA and Tukey HSD results remained interpretable. Third, the cross-sectional design did not allow causal conclusions about the direction of changes in SME readiness over time; longitudinal research was needed to confirm whether SMEs could move between readiness groups over time as a result of particular interventions.

CONCLUSION

This study identified three SME readiness groups in West Java based on the combination of financial statement quality and accounting literacy: Low (19.5%), Moderate (43.0%), and High (37.5%). The three groups differed significantly in bank-SME partnerships and financing access ($p < 0.001$, $\eta^2 > 0.70$), with a graded and consistent increase from the Low to the High group and no imbalanced readiness configurations. These findings indicated that improvements in SME readiness were gradual and holistic across financial statement quality and accounting literacy, suggesting that policy interventions should be designed in tiers according to SME readiness groups, with priority given to the Low group, which was most vulnerable to financial exclusion. Future research should broaden data sources beyond SME-owner perceptions and use longitudinal designs to confirm the dynamics of movement between readiness groups over time.

BIBLIOGRAPHY

- [1] Kementerian Koperasi dan UKM, "Perkembangan data usaha mikro, kecil, menengah, dan usaha besar tahun 2023," Kementerian Koperasi dan UKM Republik Indonesia, 2024.
- [2] Bank Indonesia, "Profil bisnis usaha mikro, kecil, dan menengah (UMKM) 2024," Bank Indonesia, 2024.
- [3] Otoritas Jasa Keuangan, "Laporan perkembangan keuangan berkelanjutan 2023," OJK, 2023.
- [4] J. B. Barney and D. N. Clark, *Resource-Based Theory: Creating and Sustaining Competitive Advantage*, 2nd ed. Oxford, U.K.: Oxford University Press, 2021.
- [5] E. P. Astuti, D. Wahyuni, and A. F. Rahman, "Implementasi SAK EMKM dan kualitas laporan keuangan UMKM: Studi empiris di Jawa Tengah," *Jurnal Akuntansi dan Keuangan Indonesia*, vol. 20, no. 2, pp. 158–176, 2023.
- [6] M. C. Jensen and W. H. Meckling, "Theory of the firm: Managerial behavior, agency costs and ownership structure," *Journal of Financial Economics*, vol. 135, no. 2, pp. 173–195, 2020.
- [7] A. N. Berger and G. F. Udell, "The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle," *Journal of Banking & Finance*, vol. 128, p. 106143, 2021.

- [8] R. A. Cole and T. Sokolyk, "Debt financing, survival, and growth of start-up firms," *Journal of Corporate Finance*, vol. 50, pp. 609–625, 2020.
- [9] OECD/INFE, "OECD/INFE 2022 international survey of adult financial literacy," OECD, 2022.
- [10] S. Wahyuni, "Analisis praktik pembukuan UMKM di Jawa Barat: Tantangan dan peluang," *Jurnal Akuntansi dan Keuangan Indonesia*, vol. 20, no. 1, pp. 45–62, 2023.
- [11] E. Suryani, A. Rahman, and H. Kusuma, "Literasi akuntansi dan kualitas pelaporan keuangan UMKM: Studi empiris di Indonesia," *Jurnal Riset Akuntansi dan Bisnis*, vol. 24, no. 1, pp. 78–95, 2024.
- [12] S. Wahyuni and F. Rahman, "Literasi akuntansi dan kualitas pelaporan keuangan UMKM: Peran moderasi teknologi digital," *Jurnal Riset Akuntansi dan Bisnis Airlangga*, vol. 9, no. 1, pp. 89–107, 2024.
- [13] United Nations, "The sustainable development goals report 2022," United Nations Department of Economic and Social Affairs, 2022.
- [14] J. F. Hair, Jr., W. C. Black, W. C. Babin, and R. E. Anderson, *Multivariate Data Analysis*, 8th ed. Boston, MA, USA: Cengage Learning, 2019.
- [15] T. Beck and A. Demirgüç-Kunt, "Financial inclusion and access to credit," *Annual Review of Financial Economics*, vol. 13, pp. 287–305, 2021.
- [16] T. Beck, A. Demirgüç-Kunt, and P. Honohan, "Law, finance, and firm access to credit," *World Bank Economic Review*, vol. 35, no. 2, pp. 392–419, 2021.
- [17] A. N. Berger, O. Guedhami, H. H. Kim, and X. Li, "Economic policy uncertainty and bank liquidity hoarding," *Journal of Financial Intermediation*, vol. 49, p. 100893, 2022.
- [18] T. C. Hoang, I. Abeysekera, and S. Ma, "The effect of financial statement comparability on earnings management: Evidence from listed firms in Vietnam," *Australian Accounting Review*, vol. 31, no. 3, pp. 196–211, 2021.
- [19] I. Purnamasari, H. Sugiharti, A. Machmud, N. Hartika, G. Ahiase, and K. Acheampong, "Cognitive bias on financial decision-making in MSMEs," *Eko-Regional: Jurnal Pembangunan Ekonomi Wilayah*, vol. 20, no. 1, pp. 95–109, 2025.
- [20] J. W. Creswell and J. D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 6th ed. Thousand Oaks, CA, USA: Sage Publications, 2023.
- [21] P. M. Podsakoff, S. B. MacKenzie, J.-Y. Lee, and N. P. Podsakoff, "Common method biases in behavioral research: A critical review of the literature and recommended remedies," *Journal of Applied Psychology*, vol. 88, no. 5, pp. 879–903, 2003.