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Digital Accounting Capabilities and Financial Reporting Quality in Kedu MSMEs: The Mediating Role of Accounting Process Efficiency and the Moderating Role of Owners' Financial Literacy

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Abstract

The digitalization of transactions in micro, small, and medium enterprises (MSMEs) does not automatically produce high-quality financial reports, because application use often stops at recording cash or payments and has not yet become an integrated capability to capture, process, verify, and present accounting information. This study examines the relationship between digital accounting capability and the financial reporting quality of MSMEs in the Kedu area through accounting process efficiency and tests owners' financial literacy as a moderator of the relationship between digital capability and process efficiency. The resource-based view frames digital accounting capability as a valuable organizational resource, while the technology–organization–environment framework explains the context of technology use. An online survey was completed by 400 MSME owners or managers, 100 each in Wonosobo, Magelang, Temanggung, and Kebumen. Data were analyzed using composite-score regression with 10,000 bootstrap resamples. Digital accounting capability was positively associated with process efficiency ($\beta = 0.425$) and reporting quality ($\beta = 0.245$), and process efficiency was positively associated with reporting quality ($\beta = 0.738$). The indirect effect at average literacy was 0.313 (95% CI [0.258, 0.369]). The interaction with literacy was 0.385, and the index of moderated mediation was 0.284 (95% CI [0.209, 0.352]), although the indirect effect was not significant at low literacy. Differences across regencies were not supported after correction for multiple testing. The findings underline the importance of integrating technology, accounting routines, and owners' financial understanding. The results are associational, come from a cross-sectional nonprobability sample of digitally reachable owners, and rely on respondents' perceptions of reporting quality.

Keywords:
Digital accounting capability; Financial reporting quality; Accounting process efficiency; Owners' financial literacy; MSMEs.

1. INTRODUCTION

The digitalization of Indonesian micro, small, and medium enterprises (MSMEs) has encouraged the use of financial technology, including digital bookkeeping applications, but the availability of technology is not necessarily followed by the ability to produce high-quality accounting information. Bank Indonesia notes that some MSMEs still regard bookkeeping as difficult, so personal and business finances are often mixed, which makes it harder for financing institutions to assess their financial condition; to address this, it developed the Sistem Informasi Aplikasi Pencatatan Informasi Keuangan (SI APIK) to help MSMEs record transactions and produce financial statements that support access to financing (Bank Indonesia, n.d.). The problem is also linked to owners' financial literacy. The 2026 National Survey of Financial Literacy and Inclusion (SNLIK) reports

a financial literacy index of 69.57% and a financial inclusion index of 93.61%, indicating that access to financial services still outpaces the understanding needed to use them well (Otoritas Jasa Keuangan et al., 2026), while Statistics Indonesia reports that micro and small industries continue to face constraints in capital, human resource and management quality, and business legality (Badan Pusat Statistik, 2025). The Kedu area is a relevant setting because differences in business environments, organizational readiness, and external support across regencies may affect how successfully MSMEs implement digital technology. The empirical scope of this study is limited to Wonosobo, Magelang, Temanggung, and Kebumen and therefore does not represent all regencies and cities in the Kedu area.

Local evidence suggests that the literacy gap shapes how technology is used rather than whether it is available. SNLIK 2026 shows a financial literacy index of 72.54% in urban areas but 64.42% in rural areas, even though financial inclusion in rural areas already reaches 90.39%, and literacy rises with educational attainment (Otoritas Jasa Keuangan et al., 2026). This gradient is relevant to the regencies studied here: in 2024, the average years of schooling of the population was 6.90 years in Wonosobo, 7.53 in Temanggung, 7.83 in Magelang, and 7.87 in Kebumen (Badan Pusat Statistik Provinsi Jawa Tengah, 2025). Studies in and around the area point in the same direction. In Wonosobo, a group of batik artisans whose production relied largely on older members had difficulty keeping digital financial records, and after being introduced to SI APIK they could follow the recording steps only with a facilitator's guidance (Rosalia et al., 2026). In Magelang Regency, financial literacy and MSME digitalization were both positively associated with the sustainability of processing-industry MSMEs (Afafa et al., 2025), whereas in East Lombok accounting digitalization was not significantly related to reporting quality once internal control was considered (Asmira & Sulkiah, 2025). Taken together, these findings indicate that access to applications is widespread but that turning digital records into reliable reports depends on owners' financial understanding. Existing local studies, however, treat literacy and digitalization as parallel predictors or describe training outcomes; they do not test whether literacy conditions the efficiency gains that digital capability produces, which is the question this study addresses.

This study draws on the resource-based view (RBV) and the technology–organization–environment (TOE) framework. The RBV holds that organizational advantage stems from the ability to develop and deploy resources and capabilities that are valuable, rare, difficult to imitate, and difficult to substitute (Barney, 1991; Wernerfelt, 1984). In this light, digital accounting capability is more than application use: IT capability and digital capability are conceptually distinct (Grego et al., 2025), and digital capability refers to an organization's ability to integrate technological resources, competencies, and organizational resources to meet strategic and operational needs (Baiyere et al., 2025). Prior studies show that digital accounting can improve the quality of accounting information in MSMEs (Hendrawati et al., 2024; Hanafiah et al., 2026), yet digitalization does not always lead to better financial reports when its use is not optimal or not supported by adequate organizational conditions (Asmira & Sulkiah, 2025), and improvements in information system quality do not always translate into better reporting quality (Amalia et al., 2026). The TOE framework explains why: technology adoption and its benefits depend on technological, organizational, and environmental contexts (Awa et al., 2016; Oliveira & Martins, 2011), so digital accounting must be supported by organizational readiness, user competence, and external conditions (Darma et al., 2024; Faiz et al., 2024; Hoang, 2024). In this study, TOE serves as a contextual lens for interpreting regional variation, and environmental factors are not measured as a separate construct.

The literature also points to mechanisms and boundary conditions that remain insufficiently tested. Regarding mechanisms, IT creates business value largely through process improvement (Melville et al., 2004): transaction integration, automated recording, digital supporting documents, and reconciliation can speed up accounting and reduce duplication and errors (Kosadi et al., 2021), and processes that are timely, traceable, and error-free make it more likely that reports are relevant, faithfully represented, comparable, verifiable, timely, and understandable (IFRS Foundation, 2018; Ikatan Akuntan Indonesia, 2016). Digitalization may therefore affect reporting quality both directly, through consistent rules, real-time data, and access controls (Bharadwaj, 2000; DeLone & McLean, 2003), and indirectly through internal mechanisms such as internal control (Fang et al., 2023), accounting information system quality (Diah et al., 2026), and accounting process efficiency (Prasetianingrum et al., 2026; Tanjung et al., 2025). Regarding boundary conditions, owners dominate technology and accounting decisions in many MSMEs, and financial literacy helps them choose appropriate features, interpret information, and maintain disciplined financial procedures (Lusardi & Mitchell, 2014; Ye & Kulathunga, 2019); without it, an application may simply move manual bookkeeping onto a screen. Regarding context, local business conditions are associated with variation in the digital adoption of small firms (Thonipara et al., 2023), but a rigorous cross-regional comparison requires measurement invariance before multigroup analysis (Cheah et al., 2023; Henseler et al., 2016). Four gaps thus emerge: application use is often equated with digital capability (conceptual gap); the process through which capability improves reporting quality is rarely tested in MSMEs (mechanism gap); the role of owners' financial literacy as a boundary condition is unclear (boundary-condition gap); and evidence on regional differences within one area is scarce (contextual gap).

Accordingly, this study examines whether digital accounting capability (DAC) is associated with higher financial reporting quality (FRQ) of MSMEs in the Kedu area through accounting process efficiency (APE) and whether owners' financial literacy (OFL) strengthens this mechanism. The hypotheses are as follows: DAC

is positively related to APE (H1); APE is positively related to FRQ (H2); DAC is positively related to FRQ (H3); APE mediates the relationship between DAC and FRQ (H4); OFL strengthens the positive relationship between DAC and APE (H5); and, because the moderation is placed on the first stage of the mediation path, the indirect effect of DAC on FRQ through APE is stronger at higher levels of OFL, expressed as (a1 + a3z)b (Hayes, 2015) (H6). Because the data are cross-sectional, the hypotheses are stated as relationships, and the terms "effect", "direct effect", and "indirect effect" in the analysis refer to regression-based estimates rather than to established causal effects. Since the direction of regional differences cannot be determined a priori, two non-directional hypotheses are proposed: the strength of the model's path coefficients differs among MSMEs in Wonosobo, Magelang, Temanggung, and Kebumen (H7), and the conditional indirect effect differs among the four regencies (H8). Because measurement invariance could not be established, H7 and H8 are tested in an exploratory manner using permutation tests rather than formal multigroup analysis (Cheah et al., 2020).

This study contributes to theory by integrating the RBV and TOE perspectives, moving beyond the identification of application use toward an understanding of how digital resources, accounting routines, owners' financial understanding, and regional context combine to shape financial reporting quality. In practical terms, it offers insights into MSMEs' digital readiness and priority support needs: owners can use the findings to separate personal and business finances, document transactions more systematically, reconcile accounts, and use financial statements for decision-making, while local governments, universities, financial institutions, and application providers can design support programs that strengthen digital accounting capability and process efficiency rather than merely promoting application use. The remainder of this article is organized as follows. Section 2 describes the research design, sample, measurement, and analysis techniques. Section 3 presents the results and discusses them in light of theory and prior studies. Section 4 concludes with the implications, limitations, and directions for future research.

2. RESEARCH METHOD

2.1. Research Design, Population, and Unit of Analysis

This study uses an explanatory quantitative approach with a cross-sectional design to test relationships among variables using data collected at a single point in time (Creswell & Creswell, 2023; Sekaran & Bougie, 2019). The unit of analysis is the MSME, and the respondents are owners or managers who understand the business's bookkeeping and financial reporting activities. The population comprises active MSMEs in the Kedu area, defined according to Government Regulation No. 7 of 2021 (Pemerintah Republik Indonesia, 2021); however, business size categories based on capital or turnover could not be verified separately from the analytical data.

The research model is presented in Figure 1. DAC is the exogenous variable, APE is the mediator, OFL is the moderator of the DAC→APE path, and FRQ is the endogenous variable.

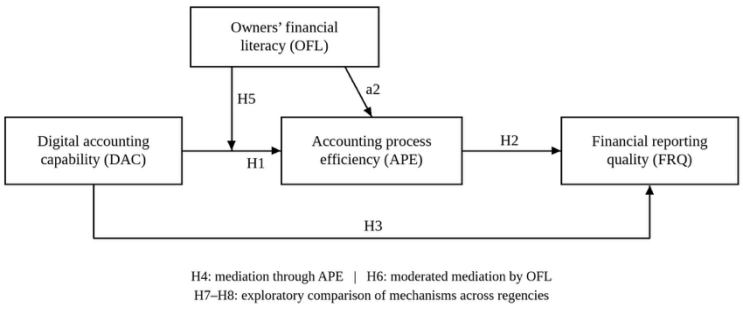


Figure 1. Research Model

DAC = digital accounting capability; APE = accounting process efficiency; OFL = owners' financial literacy; FRQ = financial reporting quality; a2 = direct effect of OFL on APE. The regional comparison (H7–H8) is exploratory.

2.2. Sample and Data Quality

The survey was distributed through an online link over approximately two months, ending in October 2026. The analytical sample consists of 400 responses, 100 each from Wonosobo, Magelang, Temanggung, and Kebumen (Table 1). Recruitment through an online link is treated as nonprobability sampling of reachable respondents. The balanced allocation provides an equal number of observations for regional exploration but does not reflect the proportions of the MSME population. The number of invitations and the profile of nonrespondents were not recorded, so the response rate cannot be calculated. The data also do not contain the information needed to confirm stratification by business size or sector.

Data quality was checked for ID uniqueness, completeness, scale range, response patterns, and regional distribution. All 400 IDs were unique, and all 8,000 item responses were complete and within the 1–5 range. There were 383 distinct item response patterns; identical patterns were not automatically treated as duplicate responses because the scale is discrete, and all observations were retained. The analytical data do not include completion time, device identifiers, or independent assessments of report outputs, so device-level duplication checks and checklist-based validation of report quality are not claimed as procedures that were performed. The risk of common method bias arising from self-reported measures collected at one point in time is taken into account when interpreting the results (Podsakoff et al., 2003).

Table 1. Distribution of the Analytical Sample

Regency	Responses	Share of sample	Use in analysis
Wonosobo	100	25%	Pooled estimation and regional exploration
Magelang	100	25%	Pooled estimation and regional exploration
Temanggung	100	25%	Pooled estimation and regional exploration
Kebumen	100	25%	Pooled estimation and regional exploration
Total	400	100%	

2.3. Construct Definitions and Measurement

All items were rated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Digital accounting capability (DAC) covers application use, transaction integration, data management, automation, and the use of digital information, and it is not equated with the number of applications used. DAC, accounting process efficiency (APE), owners' financial literacy (OFL), and financial reporting quality (FRQ) were each measured with five items (Tables 2 and 3). Composite scores were computed as the equally weighted mean of the five items. Because each aspect of DAC is represented by a single item, the analysis does not estimate a reflective–formative higher-order construct. OFL measures self-assessed financial ability rather than an objective knowledge test score, and FRQ measures perceptions of information characteristics and reporting practices rather than an audit-based assessment of the financial statements.

Table 2. Operationalization of Variables

Construct	Core dimensions/indicators	Role	Conceptual basis
Digital accounting capability (X)	Application use; transaction integration; data management; accounting automation; use of digital information for business decisions	Exogenous	RBV; Bharadwaj (2000); Melville et al. (2004); DeLone & McLean (2003)
Accounting process efficiency (M)	Recording speed; transaction accuracy; time savings; ease of data processing; automation of accounting processes	Mediator	Business-process value of IT (Melville et al., 2004); DeLone & McLean (2003)
Owners' financial literacy (Z)	Knowledge; skills; attitudes/behavior; use of information; understanding of risk	Moderator	OECD (2022); Otoritas Jasa Keuangan et al. (2026)
Financial reporting quality (Y)	Relevance; reliability; timeliness; completeness; understandability	Endogenous	IFRS Foundation (2018); Ikatan Akuntan Indonesia (2016)

Table 3. Measurement Items

Code	Item (summary)
DAC1	The ability of the MSME owner or manager to use accounting software or applications to record financial transactions.
DAC2	The ability to link financial activities such as sales, purchases, cash, and financial statements in a single digital system.
DAC3	The ability to enter, store, manage, and access financial data using digital technology.
DAC4	The ability to use features such as automatic recording, reconciliation, and digital financial reporting.
DAC5	The ability to use information generated by the digital accounting system as a basis for business decisions.
APE1	The ability of the accounting process to record transactions faster than manual methods.
APE2	The ability of the accounting system to minimize human error in recording and processing financial data.
APE3	The ability of the accounting system to reduce the time required for recording and report preparation.

APE4	The ability of the accounting system to process transactions into financial information in a practical way.
APE5	The extent to which technology is used to automate routine accounting activities.
OFL1	The owner's understanding of basic financial concepts such as revenue, costs, profit, and assets.
OFL2	The owner's ability to read and understand information in financial statements.
OFL3	The owner's ability to manage income, expenses, and the business's cash position.
OFL4	The owner's ability to make decisions on investment, financing, and the use of capital.
OFL5	The owner's ability to understand the financial risks of running the business.
FRQ1	The extent to which financial statements provide information that meets users' decision-making needs.
FRQ2	The extent to which financial statements present accurate and reliable information.
FRQ3	The ability of the MSME to provide financial statements when the information is needed.
FRQ4	The extent to which financial statements fully record all significant transactions.
FRQ5	The ease with which users can read and understand the information presented in financial statements.

2.4. Data Analysis Techniques

The analysis was performed on observed composite scores using ordinary least squares (OLS) regression. Internal consistency was assessed using Cronbach's alpha, and the empirical distinctiveness of the constructs was examined in an exploratory manner using the heterotrait–monotrait ratio (HTMT) (Henseler et al., 2015). An HTMT value below 0.85 is a conservative threshold, while 0.90 is a more lenient threshold for conceptually similar constructs. A very high alpha does not automatically indicate a better instrument because it may signal redundant items; all items were retained in line with the content of the instrument.

The scores for DAC (X), APE (M), OFL (Z), and FRQ (Y) were standardized using the sample mean and standard deviation. The model consists of the following two equations, so the moderation is placed on the first stage:

$$M = i_M + a_1X + a_2Z + a_3XZ + e_M \quad (1)$$
$$Y = i_Y + c'X + bM + e_Y \quad (2)$$

Where X is DAC, M is APE, Z is OFL, Y is FRQ, XZ is the product of standardized DAC and OFL, a_1, a_2, a_3, b, and c′ are regression coefficients, i_M and i_Y are intercepts, and e_M and e_Y are error terms. The indirect effect at literacy level z is $(a_1 + a_3z)b$, and the index of moderated mediation is a_3b (Hayes, 2015). Bootstrap standard errors and 95% percentile confidence intervals were computed from 10,000 resamples of respondents with replacement (seed 20261017), with standardization recomputed in each bootstrap sample. A hypothesis is considered statistically supported when the two-sided interval does not include zero. Conditional effects were evaluated at $z = -1$, 0, and +1. R^2 describes the variance explained within the sample, not out-of-sample predictive validity.

The comparison across regencies was conducted in an exploratory manner using the same equations and a fixed pooled standardization so that coefficients share a common scale. Differences in the three main paths (a_1, b, a_3), the index of moderated mediation, and the indirect effects at $z = -1$, 0, and +1 were examined for six pairs of regions. Two-sided tests used 10,000 permutations of regional labels, and Monte Carlo p-values were computed with a plus-one correction. All 42 comparisons (6 pairs × 7 quantities) were corrected jointly using the Benjamini–Hochberg procedure, and the corrected p-values are denoted q (Benjamini & Hochberg, 1995). Permuting labels assumes that distributions are exchangeable under the null hypothesis. Because measurement invariance has not been established, these results are not treated as PLS-MGA or as evidence of construct equivalence; the MICOM guidelines and the multigroup analysis literature emphasize these interpretive limits (Cheah et al., 2020; Henseler et al., 2016). The sequence of analyses and decision criteria is summarized in Table 4.

Table 4. Sequence of Analyses and Decision Criteria

Stage	Check	Main decision
1	Completeness and range	400 unique IDs; 8,000 complete responses within the 1–5 scale.
2	Internal consistency and HTMT	Alpha and HTMT reported as exploratory checks; the APE–FRQ limitation is acknowledged.
3	Composite regression	Two OLS equations on standardized scores; coefficients and R^2.
4	Mediation and moderation	10,000 bootstrap resamples; 95% percentile intervals, conditional effects, and index of moderated mediation.
5	Regional comparability	Pooled standardization; construct invariance not established.
6	Exploratory comparison	10,000 permutations per pair; 42 tests corrected with Benjamini–Hochberg.

7	Interpretive limits	Associational relationships; no audit of reports and no controls for size or sector, which were unavailable.

2.5. Research Ethics

Before completing the online survey, respondents received an explanation of the study and consented to the use of their responses for research purposes. The study did not obtain approval from a formal ethics committee. Results are reported only in aggregate form and do not include respondents' identities.

2.6. Design Limitations and Safeguards

Two design features constrain inference and are addressed explicitly. First, the cross-sectional design captures DAC, APE, OFL, and FRQ at the same point in time, so the ordering DAC → APE → FRQ is specified from theory (Barney, 1991; Melville et al., 2004) rather than observed. A reverse or reciprocal pattern, in which businesses that already produce better reports invest more in digital tools and routines, cannot be ruled out with these data. For this reason, the estimates are interpreted as associations, the indirect effects are read as statistical mediation consistent with the proposed mechanism rather than as proof of causal transmission, and the moderation is read as a difference in the strength of association across literacy levels. Bootstrap intervals and the joint Benjamini–Hochberg correction reduce the risk of overstating uncertain estimates, but they do not substitute for temporal separation of the measures.

Second, because the questionnaire was distributed through an open online link, inclusion probabilities are unknown and the sample cannot be weighted to the MSME population. The procedure is likely to over-represent owners and managers who are digitally connected and willing to respond, which is consistent with the high sample means for DAC (4.365) and OFL (4.260) on a five-point scale (Section 3.1). This selection has two consequences. Statistically, other things being equal, a restricted range of DAC and OFL tends to attenuate rather than inflate observed associations, so the estimated relationships are unlikely to be produced by the recruitment method alone. Substantively, the results describe the mechanism among relatively digitalized MSMEs and may not hold for businesses that keep only manual records. The target of generalization is therefore the relationship among the constructs (analytic generalization) within comparable, digitally reachable MSMEs, not the prevalence of digital capability or reporting quality across all MSMEs in the Kedu area. The balanced quota of 100 respondents per regency ensures that each regency contributes equally to the pooled and regional estimates, but it does not make the sample representative of any regency.

3. RESULTS AND DISCUSSION

3.1. Measurement and Descriptive Results

All 400 observations passed the completeness and scale-range checks. The means (standard deviations) were 4.365 (0.508) for DAC, 2.948 (1.313) for APE, 4.260 (0.562) for OFL, and 3.448 (0.502) for FRQ. Cronbach's alpha values were 0.791, 0.973, 0.833, and 0.947, respectively. The very high alpha for APE calls for caution regarding possible redundancy in item content. The HTMT values for DAC–APE, DAC–OFL, DAC–FRQ, APE–OFL, APE–FRQ, and OFL–FRQ were 0.535, 0.610, 0.680, 0.683, 0.888, and 0.807, respectively. The APE–FRQ pair exceeds the conservative 0.85 threshold, although it remains below 0.90, so the distinctiveness of these two constructs is not claimed without qualification. Table 5 shows the number of observations and mean scores by region.

Table 5. Number of Observations and Mean Scores by Region

Indicator	Total	Wonosobo	Magelang	Temanggung	Kebumen
Observations	400	100	100	100	100
Mean DAC	4.365	4.338	4.466	4.236	4.420
Mean APE	2.948	2.920	2.928	2.922	3.020
Mean OFL	4.260	4.258	4.420	4.090	4.270
Mean FRQ	3.448	3.380	3.466	3.370	3.576

3.2. Hypothesis Testing

Table 6 presents the results of the regression and moderated mediation analysis, and Table 7 presents the exploratory comparison of coefficients across regencies.

Table 6. Results of the Regression and Moderated Mediation Model

Hypothesis	Path/effect	Estimate	SE	95% CI	Decision
H1	DAC → APE	0.425	0.035	[0.357, 0.494]	Supported
H2	APE → FRQ	0.738	0.026	[0.682, 0.781]	Supported
H3	DAC → FRQ	0.245	0.031	[0.186, 0.308]	Supported
H4	DAC → APE → FRQ	0.313	0.029	[0.258, 0.369]	Supported
H5	DAC × OFL → APE	0.385	0.042	[0.297, 0.461]	Supported

H6	Index of moderated mediation	0.284	0.037	[0.209, 0.352]	Supported

Note: Estimates use standardized scores; the interaction is the product of standardized DAC and OFL. H1 and H4 are interpreted at mean OFL (z = 0). SE is the bootstrap standard error; CI is the percentile confidence interval. The coefficient of OFL → APE (a_2) is 0.482 (95% CI [0.416, 0.544]). $R^2 = 0.596$ for APE and 0.774 for FRQ. The indirect effect is 0.030 at z = −1 (CI [−0.035, 0.099]) and 0.597 at z = +1 (CI [0.486, 0.705]); the interval at low literacy includes zero.

Table 7. Exploratory Comparison of Coefficients across Regencies

Comparison	Δa1	Δb	Δa3	Smallest q (H7)	Smallest q (H8)
Wonosobo–Magelang	0.146	0.048	0.166	0.396	0.215
Wonosobo–Temanggung	0.095	−0.263	0.078	0.052	0.686
Wonosobo–Kebumen	0.125	−0.104	0.081	0.287	0.886
Magelang–Temanggung	−0.051	−0.311	−0.088	0.052	0.147
Magelang–Kebumen	−0.020	−0.152	−0.085	0.215	0.526
Temanggung–Kebumen	0.031	0.159	0.003	0.234	0.581

Note: Δ = coefficient of the first region minus that of the second; a1 = DAC → APE, b = APE → FRQ, a3 = interaction. The smallest q summarizes the corrected p-values for the three H7 paths or the four H8 indirect-effect measures in each pair; correction was applied jointly to all 42 tests. All q > 0.05. Construct equivalence across regions has not been established.

3.3. Discussion of the Relationships among Variables

H1 and H2 are statistically supported: digital accounting capability is positively associated with accounting process efficiency, which in turn is associated with financial reporting quality. H4 is supported because the indirect effect DAC→APE→FRQ at mean OFL has a confidence interval that excludes zero. Because the direct effect tested in H3 is also positive and its interval excludes zero, the pattern is consistent with complementary partial mediation: DAC is related to FRQ both directly and through APE. This pattern is consistent with the RBV explanation of the value of organizational routines (Barney, 1991; Melville et al., 2004) and with evidence on the role of process efficiency in MSMEs (Tanjung et al., 2025), although the predictors in that study differ. H5 and H6 are supported by a positive interaction and an index of moderated mediation whose interval excludes zero. Financial literacy appears to help owners translate digital features into orderly procedures. However, the conditional indirect effect at low literacy cannot be distinguished from zero. The cross-sectional design does not establish causal ordering, and the close measurement of APE and FRQ may inflate the observed relationship. Because the coefficient b enters both the indirect effect and the index of moderated mediation, any such inflation would also enlarge these two estimates; the first-stage estimates a1 and a3 do not involve FRQ and are therefore not affected by this overlap, so the evidence for H1 and H5 is less exposed to this concern than the evidence for H2, H4, and H6.

The descriptive profile adds a further nuance. Respondents rated their digital accounting capability highly (mean 4.365, SD 0.508), but accounting process efficiency was rated near the midpoint of the scale and varied far more widely (mean 2.948, SD 1.313), with financial reporting quality in between (mean 3.448). Although means of different constructs measured with different items are only indicative, this pattern suggests a gap between the capability that owners perceive and the efficiency they actually realize: many businesses appear able to operate applications without yet having automated or integrated their recording, reconciliation, and report preparation. This is consistent with evidence that MSMEs using online transactions still treat digital receipts as manual records and lack automated reconciliation (Kosadi et al., 2021), and with the capability–reporting gap reported for MSMEs in Kendari (Amalia et al., 2026). The wide dispersion of APE also explains why the moderation is visible: it is precisely in the conversion of capability into efficient routines that businesses differ most, and owners' financial literacy is associated with which side of that gap a business falls on.

The Δ values show the direction and size of coefficient differences on the pooled scale, not a ranking of MSME quality in any regency. All q-values from the 42 comparisons exceed 0.05, so the exploration does not support H7 or H8. This result does not prove that all regencies share identical mechanisms, and the descriptive and numerical patterns are still informative because they indicate where regional differences, if they exist, are most likely to be found.

Three patterns stand out. First, the regencies differ more in levels than in mechanisms. Magelang has the highest mean DAC (4.466) and OFL (4.420), Temanggung the lowest (4.236 and 4.090), and Kebumen the highest APE (3.020) and FRQ (3.576), while the APE means of Wonosobo, Magelang, and Temanggung are almost identical (2.920–2.928) (Table 5). Higher capability and literacy in Magelang therefore do not appear as visibly higher process efficiency, which echoes the argument that technology resources create value only when they are embedded in routines (Melville et al., 2004). Second, the largest coefficient differences concern the second stage of the mechanism. The APE → FRQ path is numerically stronger in Temanggung than in the other three regencies (|Δb| from 0.159 to 0.311), and the comparisons with Wonosobo and Magelang produce the smallest corrected values in the whole set (q = 0.052) (Table 7). A tentative interpretation is that where

capability and literacy are scarcer, improvements in processing are more decisive for reporting quality, whereas where baseline capability is higher, reporting quality depends more on other factors such as standards, classification, and controls. Third, the first-stage path and the moderation are numerically largest in Wonosobo, exceeding the other regencies by 0.095–0.146 for a1 and 0.078–0.166 for a3, and smallest in Magelang. Wonosobo also has the lowest average years of schooling of the four regencies (Badan Pusat Statistik Provinsi Jawa Tengah, 2025), so differences between more and less literate owners may matter more there for whether digital tools actually speed up accounting work, which is consistent with local reports that digital recording depends on guided support (Rosalia et al., 2026). In Magelang, by contrast, the combination of the highest DAC and OFL means with the smallest a1 and a3 is consistent with diminishing marginal returns once most owners already have high capability. These interpretations are hypotheses for future testing rather than findings, because none of the differences remains significant after correction.

Several reasons may explain why these numerical differences are not statistically supported. The regional samples are similar on the moderator: apart from Temanggung, mean OFL ranges only from 4.258 to 4.420, so the online recruitment may have reached relatively literate owners in every regency and narrowed the contrasts that population indicators would suggest; the Wonosobo sample, for example, has almost the same mean OFL as the Kebumen sample (4.258 and 4.270) despite the difference of nearly one year in average schooling between the two populations. In addition, with 100 observations per regency, permutation tests of differences in interaction and indirect effects have limited power, and measurement equivalence across regencies has not been established. From the TOE perspective, the absence of significant differences should therefore be read as an absence of evidence rather than as evidence that regional environments are irrelevant. Future studies should measure environmental conditions directly, such as internet stability, the availability of mentoring, the sectoral composition of MSMEs, and the type of accounting application used, and should draw larger regional samples so that regional moderation can be tested with adequate power. Regencies are not ranked on the basis of a single coefficient; intervention needs should be determined from directly assessed business conditions.

3.4. Practical Implications for MSMEs and Stakeholders

Table 8 translates the research mechanisms into intervention options for different conditions that can be diagnosed in MSMEs.

Table 8. Translating the Research Mechanisms into Intervention Options

Condition to be checked	Diagnosis	Practical action
Low DAC; low literacy	Problem of resources and basic understanding	Clinics on separating business money, a simple chart of accounts, digital records, and cash flow simulations before advanced applications.
High DAC; low APE	Technology not yet integrated into routines	Process mapping, POS–inventory–cash integration, input SOPs, weekly reconciliation, and monthly closing.
High APE; low FRQ	Fast processes but weak standards or controls	Review of classification, completeness, depreciation, receivables, inventory, access controls, and an SAK EMKM checklist.
Strong literacy moderation	The owner is the main lever	Decision-based training (pricing, margins, working capital, loans) delivered together with application training.
Regional needs differ after verification	Local support needs to be mapped	Adjust mentoring channels, partnerships, internet support, priority sectors, and application complexity based on local assessments.

For MSMEs, the implications can be applied through an assessment of the four constructs and a 90-day plan: separating transactions in the first month, consolidating records and reconciling accounts in the second month, and closing the books and using the reports in the third month. For banks, high-quality reports can complement cash flow assessments and reduce verification costs without making a particular application the sole requirement. For local governments and universities, directly verified business needs should guide the allocation of training modules and the intensity of mentoring. For application providers, weak indicators point to features that need to be simplified, integrated, or equipped with controls.

3.5. Theoretical Contributions

First, this study operationalizes digital accounting capability as a bundle of resources and routines, extending the RBV from technology ownership toward the orchestration of accounting capabilities. Second, the process efficiency mediator explains the mechanism of value creation: part of the relationship between digital resources and reporting quality operates through processing routines. Third, owners' financial literacy introduces a micro-organizational condition associated with how productive the capability is. Fourth, the

exploration of four regencies places these mechanisms within the TOE context but does not demonstrate that the regional environment changes the strength of the relationships. The RBV–TOE integration thus provides an interpretive framework covering resources, processes, boundary conditions, and context, while environmental factors still need to be measured directly in future research.

4. CONCLUSION

This study shows that digital accounting capability is positively associated with the financial reporting quality of MSMEs, both directly and indirectly through accounting process efficiency. Based on data from 400 respondents, accounting process efficiency acts as a partial mediator, and owners' financial literacy strengthens the relationship between digital accounting capability and process efficiency and therefore the indirect effect; at low levels of literacy, however, the indirect effect is not significant. Differences in mechanisms across Wonosobo, Magelang, Temanggung, and Kebumen were not supported after correction for multiple testing, although numerical patterns, such as a stronger link between process efficiency and reporting quality in Temanggung, offer hypotheses for future research. These findings contribute to theory by explaining the role of accounting process efficiency and financial literacy as a mechanism and a boundary condition in the relationship between digital accounting capability and financial reporting quality.

In practical terms, the results confirm that developing digital accounting capability requires more than using applications; it must be supported by stronger financial literacy, efficient recording, and the use of accounting information in decision-making. MSME development programs should therefore integrate digital technology training, financial competence building, and stronger accounting governance to support better financial reporting. The result for owners with low financial literacy is particularly relevant for policy: at one standard deviation below mean literacy, the indirect effect is close to zero (0.030, 95% CI [−0.035, 0.099]), which indicates that for these owners' application training alone is unlikely to be followed by better reports. Programs targeting this group should begin with, or be bundled with, basic financial literacy, such as separating business and personal money, understanding profit and cash flow, and reading simple statements, rather than offering technology first.

This study has several limitations that bear directly on external validity. First, the cross-sectional design captures all constructs at one point in time, so the direction DAC → APE → FRQ rests on theory and cannot be established empirically; reverse or reciprocal relationships remain possible. Second, the nonprobability online sample is likely to over-represent digitally connected and relatively literate owners, as the high means for DAC and OFL indicate, and the balanced allocation of 100 respondents per regency does not reflect the distribution of MSMEs. The findings should therefore be generalized to the mechanism among comparable, digitally active MSMEs in the four regencies studied, not to all MSMEs in the Kedu area, to other regencies and cities, or to MSMEs that rely only on manual records. Third, collecting all data through a single questionnaire may introduce common method bias (Podsakoff et al., 2003), and FRQ is measured through perceptions rather than through examination of actual reports. Fourth, business size, sector, and the type of application used are not controlled, the HTMT value of 0.888 between APE and FRQ calls for caution in interpreting discriminant validity, and the regional comparison is constrained by unestablished measurement invariance and a sample of 100 per region. Future research should use panel or multi-wave designs that separate the measurement of capability, efficiency, and reporting quality in time; probability sampling from official MSME registries, stratified by regency, size, and sector, with response rates and nonrespondent profiles recorded; independent data sources such as checklist-based assessments of actual financial statements; measurement invariance testing before multigroup comparison; and replication in other regions of Indonesia to establish how far the mechanism generalizes.

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