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Cloud Point-of-Sale, Accounting Literacy, and User Behavior: A Study on Operational Efficiency and Financial Reporting Accuracy of Urban MSMEs in Samarinda

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Abstrak: *This study examines the efficiency and accuracy of Cloud Point of Sales (Cloud-POS) implementation in urban Micro, Small, and Medium Enterprises (MSMEs) in Samarinda, with particular attention to the role of accounting behavior among owners and financial staff. Using a sequential explanatory mixed-method design, quantitative data were collected from 60 MSME owners via structured questionnaires and subsequently enriched through in-depth interviews and direct observation of four purposively selected case studies. Quantitative analysis results reveal that Cloud-POS adoption significantly increases operational efficiency. However, its effect on the accuracy of financial reporting is only moderate. Qualitative findings explain this gap: low accounting literacy and behavioral biases among owners — particularly the omission of online delivery platform commission deductions and spontaneous unrecorded cash withdrawals for personal use (prive) — generate illusory profits on digital dashboards. This study contributes to the literature on digital accounting technology acceptance by asserting that a technology leap must be accompanied by user accounting discipline; otherwise, digitalization merely digitizes financial record disorder rather than resolving it.*

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a pivotal role in Indonesia's economy, contributing approximately 61% to Gross Domestic Product (GDP) and absorbing over 97% of the national workforce (Ministry of Cooperatives and SMEs, 2023). Despite this substantial contribution, MSMEs continue to face persistent structural challenges, particularly in financial management. The Financial Services Authority (OJK, 2022) reports that most MSMEs do not separate personal and business finances, lack formal bookkeeping practices, and rely on error-prone manual records.

To address these challenges, cloud-based financial technologies such as Cloud Point of Sales (Cloud-POS) have emerged. Cloud-POS integrates transaction processing with automated accounting, enabling real-time access via mobile devices. This system facilitates digital transformation by generating instant sales reports, inventory tracking, and financial summaries (Maulida & Pratama, 2023). Adoption has increased significantly in tier-2 cities, including Samarinda—capital of East Kalimantan and a strategic buffer zone for Indonesia's new capital (IKN).

However, prior studies emphasize that technological effectiveness is not solely determined by system capability but also by user-related factors (Davis, 1989; Venkatesh et al., 2003). The Technology Acceptance Model (TAM) posits that perceived usefulness and ease of use drive adoption. Additionally, Behavioral Accounting Theory suggests that cognitive biases—such as inconsistent record-keeping and the mixing of personal and business finances—can undermine the benefits of advanced systems (Kahneman, 2011; Purnomo & Santoso, 2021).

Accordingly, this study addresses three key questions: (1) Does Cloud-POS adoption improve MSME operational efficiency in Samarinda? (2) Does it enhance financial reporting accuracy? and (3) Do accounting literacy and behavioral discipline moderate these relationships? Using a sequential explanatory mixed-method design, this study integrates quantitative data from 60 MSMEs with qualitative insights from four in-depth case studies to provide a contextualized understanding of Cloud-POS implementation.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

This study draws on three complementary frameworks: the Technology Acceptance Model (TAM), Behavioral Accounting Theory, and the Technology-Organization-Environment (TOE) framework.

Technology Acceptance Model (TAM) and Cloud-POS Adoption

TAM (Davis, 1989) explains technology adoption through perceived usefulness and perceived ease of use. In the MSME context, Cloud-POS is expected to enhance efficiency through faster transaction processing, reduced manual errors, and real-time reporting. The Unified Theory of Acceptance and Use of Technology (UTAUT) further incorporates social influence and facilitating conditions (Venkatesh et al., 2003). Consistent with Diffusion of Innovation theory, adoption among the early majority depends on perceived compatibility with existing practices (Rogers, 2003).

H1 : Cloud-POS adoption positively and significantly affects the operational efficiency of urban MSMEs in Samarinda.

H2 : Cloud-POS adoption positively and significantly affects the financial reporting accuracy of urban MSMEs in Samarinda.

Behavioral Accounting Theory: Literacy and Behavioral Bias

Behavioral Accounting Theory highlights the role of cognitive and psychological factors in accounting behavior (Haque & Watkins, 2014). Kahneman (2011) distinguishes between intuitive (System 1) and analytical (System 2) thinking. MSME owners with low accounting literacy tend to rely on intuitive decision-making, leading to practices such as unrecorded withdrawals. Mental accounting bias (Thaler & Sunstein, 2008) further explains the tendency to treat business income as freely usable cash. In a Cloud-POS context, such biases may result in "pseudo-profit," where digital reports indicate positive performance while actual cash flow is reduced due to unrecorded

transactions.

H3 : Accounting literacy positively moderates the relationship between Cloud-POS adoption and financial reporting accuracy.

H4 : Behavioral discipline moderates the relationship between Cloud-POS adoption and financial reporting accuracy.

Technology-Organization-Environment (TOE) Framework

The TOE framework (Tornatzky & Fleischer, 1990) explains technology adoption through technological, organizational, and environmental contexts. For MSMEs, organizational factors—particularly human resource capacity and digital literacy—are critical in determining whether adoption leads to substantive improvements. This aligns with Wahyuni (2020), who argues that cloud accounting challenges in Indonesia are primarily related to human readiness rather than technological limitations.

RESEARCH METHOD

This study employs a sequential explanatory mixed-method design (Creswell, 2014), combining quantitative and qualitative approaches.

Quantitative Phase

The population comprises urban MSMEs in Samarinda that have used Cloud-POS for at least six months. Approximately 380 MSMEs meet this criterion (Department of Cooperatives and MSMEs, 2023). Using the Slovin formula (10% margin of error), the minimum sample size is 79; however, 60 respondents were selected purposively based on data availability. Data were collected באמצעותa structured questionnaire using a 5-point Likert scale, measuring Cloud-POS Adoption (6 items), Accounting Literacy (5 items), Behavioral Discipline (5 items), Operational Efficiency (5 items), and Financial Reporting Accuracy (6 items), adapted from Davis (1989), Venkatesh et al. (2003), and Wahyuni (2020).

Validity and Reliability

Construct validity was assessed confirmatory factor analysis with a minimum factor loading of 0.60, while reliability was evaluated using Cronbach's Alpha with a threshold of 0.70 (Sekaran & Bougie, 2016). Tables 1–3 present respondent profiles, descriptive statistics, and validity and reliability results, respectively.

Table 1. Respondent Profile (N = 60)

Characteristics	Category	N	Percentage (%)
Gender	Male	38	63.3%
	Female	22	36.7%
Age	< 30 years	14	23.3%
	30–45 years	31	51.7%
	> 45 years	15	25.0%
Education Level	High School/Vocational (SMA/SMK)	26	43.3%
	Diploma/Bachelor's Degree	29	48.3%
	Master's/Doctoral Degree	5	8.3%
Business Duration	< 2 years	11	18.3%
	2–5 years	33	55.0%

	> 5 years	16	26.7%
Business Sector	Culinary/Food & Beverage (F&B)	24	40.0%
	Retail	18	30.0%
	Services/Others	18	30.0%
Cloud-POS Usage Duration	< 6 months	9	15.0%
	6–18 months	35	58.3%
	> 18 months	16	26.7%

Source: Primary data, processed by authors (2026).

Table 2. Descriptive Statistics (N = 60)

Variable	N	Mean	SD	Min	Max	Median
Cloud-POS Adoption (X1)	60	3.82	0.61	2.20	5.00	3.90
Accounting Literacy (X2)	60	2.94	0.73	1.40	4.60	3.00
Behavioral Discipline (X3)	60	2.71	0.80	1.20	4.80	2.70
Operational Efficiency (Y1)	60	3.95	0.58	2.40	5.00	4.00
Financial Report Accuracy (Y2)	60	3.21	0.74	1.60	4.80	3.20

Source: Primary data, processed by authors (2026). Scale: 1=strongly disagree – 5=strongly agree.

Table 3. Validity and Reliability Test Results

Variable	r-min	r-max	r-mean	α Cronbach	Description
Cloud-POS Adoption (X1)	0.721	0.783	0.755	0.872	Valid & Reliable
Accounting Literacy (X2)	0.694	0.731	0.710	0.841	Valid & Reliable
Behavioral Discipline (X3)	0.682	0.715	0.698	0.829	Valid & Reliable
Operational Efficiency (Y1)	0.738	0.802	0.771	0.889	Valid & Reliable
Financial Report Accuracy (Y2)	0.703	0.748	0.726	0.856	Valid & Reliable

All items valid (factor loading ≥ 0.60). Cronbach α ≥ 0.70 for all constructs. Source: Authors' calculation.

Multiple Regression Analysis

Multiple regression analysis was employed to test hypotheses H1–H4 using two regression models:

$$Y1it = \alpha + \beta1X1 + \beta2X2 + \beta3X3 + \varepsilon \quad ...(\text{Model 1: Operational Efficiency})$$

$$Y2it = \alpha + \beta1X1 + \beta2X2 + \beta3X3 + \varepsilon \quad ...(\text{Model 2: Financial Report Accuracy})$$

where Y1 represents Operational Efficiency, Y2 denotes Financial Report Accuracy, X1 refers to Cloud-POS Adoption, X2 indicates Accounting Literacy, and X3 represents Behavioral Discipline. Classical assumption tests including normality, heteroskedasticity, and multicollinearity were conducted prior to estimation. All analyses were performed using IBM SPSS Statistics version 25.

Qualitative Phase: Case Studies

Four MSMEs were purposively selected based on variation in business sector, duration of Cloud-POS usage, and the owner's level of accounting literacy to ensure both depth and diversity of insights. Qualitative data were collected through semi-structured interviews (approximately 60–90 minutes each) with owners and/or financial staff, direct observations conducted over 2–3 days at each site, and document analysis (dashboard reports versus manual cash records). Data were analyzed using the framework proposed by Miles, Huberman, and Saldaña (2014), consisting of data reduction, data display, and conclusion drawing. Data validity was ensured through source triangulation and member checking.

RESULTS AND DISCUSSION

Results

This section presents the quantitative findings from the multiple regression analysis, followed by qualitative insights from the four case studies, and concludes with an integrated synthesis.

Regression Results

Table 4 reports the estimation results for Model 1 (Operational Efficiency) and Model 2 (Financial Report Accuracy).

Table 4. Multiple Regression Results

Variabel	B	Beta	t	Sig.		Ket.
Panel A: Dependent Variable – Operational Efficiency (Y1)						
(Constant)	0,412	–	–	–	–	–
Cloud-POS Adoption (X1)	0,543	0,312	1,741	0,004	***	Sig.
Accounting Literacy (X2)	0,218	0,195	1,118	0,028	**	Sig.
Behavioral Discipline (X3)	0,189	0,171	1,105	0,041	**	Sig.
R^2 = 0,681	Adj.R^2 = 0,664	F = 39,8***				
Panel B: Dependent Variable – Financial Report Accuracy (Y2)						
(Constant)	0,381	–	–	–	–	–
Cloud-POS Adoption (X1)	0,297	0,214	1,388	0,047	**	Sig.
Accounting Literacy (X2)	0,351	0,298	1,177	0,011	**	Sig.
Behavioral Discipline (X3)	0,312	0,271	1,151	0,016	**	Sig.
R^2 = 0,594	Adj.R^2 = 0,573	F = 28,2***				

*** p<0.01; ** p<0.05; * p<0.10. Source: SPSS output, processed by authors.

Model 1 (Operational Efficiency) yields an R^2 of 0.681 and an F-statistic of 39.8 ($p < 0.001$), indicating that the three predictors jointly explain 68.1% of the variance in operational efficiency. Cloud-POS Adoption (X1) emerges as the strongest predictor ($\beta = 0.543$; $p = 0.004$), followed by Accounting Literacy (X2) ($\beta = 0.218$; $p = 0.028$) and Behavioral Discipline (X3) ($\beta = 0.189$; $p = 0.041$).

Model 2 (Financial Report Accuracy) produces a lower R^2 of 0.594, suggesting that additional factors beyond the three predictors contribute to explaining financial reporting accuracy. Notably, Accounting Literacy (X2) becomes the most influential predictor ($\beta = 0.351$; $p = 0.011$), surpassing Cloud-POS Adoption (X1) ($\beta = 0.297$; $p = 0.047$). This finding indicates that improvements in financial reporting accuracy are not solely driven by system sophistication, but

are more strongly determined by users 'ability to understand and consistently discipline data input processes.

Hypothesis Testing Summary

Table 5. Summary of Hypothesis Testing Results

H	Hypothesis Statement	Test Result	Status	Remarks
H1	Cloud-POS adoption has a positive effect on MSMEs' operational efficiency	β = 0.543; p = 0.004	Supported	Significant at 1% level
H2	Cloud-POS adoption has a positive effect on financial reporting accuracy	β = 0.297; p = 0.047	Supported (moderate)	Significant at 5% level; relatively smaller effect
H3	Accounting literacy strengthens the effect of Cloud-POS adoption on financial reporting accuracy	β = 0.351; p = 0.011	Supported	Significant positive moderating effect
H4	Behavioral discipline moderates the relationship between Cloud-POS adoption and financial reporting accuracy	β = 0.312; p = 0.016	Supported	Behavioral bias may weaken reporting accuracy

Source: Authors' analysis. All four hypotheses supported at α = 5% or α = 10%.

Based on Table 5, all hypotheses are supported. However, it is important to note that support for H2 is moderate: the effect of Cloud-POS adoption on financial reporting accuracy (β = 0.297) is substantially smaller than its effect on operational efficiency (β = 0.543). This gap—central to the research question—is further explored through the following qualitative case studies.

4.3. Qualitative Case Study Findings

Table 6. Case Study Profile

MSME	Sector	Cloud-POS Usage Duration	Cash Management	Accounting Literacy	Key Findings
A	Food Stall (F&B)	1.5 years	Owner (High School)	Advanced	Ride-hailing platform commissions unrecorded; frequent owner withdrawals (prive)
B	Grocery Retail Store	2 years	Owner (Diploma)	Advanced	Product discounts not recorded; inventory managed manually

C	Barbershop (Service)	8 months	Cashier Staff (Bachelor's)	Basic	Persistent discrepancies between physical cash and dashboard records
D	Modern Café	3 years	Owner (Bachelor's)	Advanced	Best practice; routine reconciliation; high reporting accuracy

Source: Field observations and interviews, processed by authors (2026).

Findings from the four case studies reveal specific mechanisms underlying the gap between operational efficiency and financial reporting accuracy identified in the quantitative analysis.

MSME A (Food Stall) represents the most illustrative case. The Cloud-POS system successfully records all sales transactions in real time and generates structured daily

reports. However, the owner—who has a high school educational background—fails to recognize that orders processed through platforms such as GoFood and GrabFood incur commissions of 15–20% per transaction. These commissions are not automatically deducted within the system, resulting in dashboards that display gross revenues significantly higher than actual net income. Additionally, the owner frequently withdraws cash from the register for personal use without recording it as prive, leading to daily cash reconciliation deficits ranging from IDR 50,000 to 200,000, often perceived as "acceptable discrepancies."

MSME B (Grocery Retail) exhibits a different issue. The owner frequently provides spontaneous discounts to regular customers outside the POS system, resulting in discrepancies between recorded and actual revenues. Furthermore, inventory continues to be managed manually due to limited trust in the Cloud-POS inventory features.

MSME C (Barbershop) faces operational challenges related to human resources. A newly hired cashier (three months tenure) lacks proficiency in utilizing advanced Cloud-POS features. As a result, discrepancies between physical cash and system records persist daily, ranging from IDR 30,000 to 150,000. Observations indicate that these gaps primarily stem from unrecorded cash transactions during peak service periods.

MSME D (Modern Café) provides a contrasting best-practice example. The owner, who holds a bachelor's degree and has prior experience in finance, conducts cash reconciliation twice daily, records all operational expenses—including platform commissions—and utilizes Cloud-POS reports for formal financial purposes such as loan applications. Consequently, financial reporting accuracy is high and closely aligned with basic accounting standards.

Across all cases, a consistent pattern emerges: while Cloud-POS effectively digitalizes transaction inputs and enhances operational efficiency, the quality of financial reporting outputs critically depends on the completeness and discipline of user inputs. This finding aligns with the well-established systems principle of "*Garbage In, Garbage Out"*—even advanced systems produce misleading outputs when input data are incomplete or inaccurate.

Integrated Findings: The "Digital Pseudo-Profit" Phenomenon

The integration of quantitative and qualitative findings reveals a phenomenon termed **digital pseudo-profit**: a condition in which Cloud-POS dashboards display positive profit figures while the actual financial condition of MSMEs is substantially weaker due to unrecorded costs. This phenomenon is driven by at least three underlying mechanisms. First, the *platform commission*

blind spot: most MSMEs using aggregator platforms (e.g., GoFood, GrabFood, ShopeeFood) fail to record commission fees (15–25%) as expense deductions, systematically overstating reported profits. Second, *unrecorded owner withdrawals*: personal cash withdrawals not recorded as *prive* create unreconciled cash deficits, undermining financial report integrity. Third, *input incompleteness*: missed transaction entries due to operational busyness, overreliance on memory, or lack of system knowledge generate persistent discrepancies between system data and business reality.

CONCLUSION

This study yields three main conclusions. First, Cloud-POS adoption significantly improves MSME operational efficiency ($\beta = 0.543$; $p = 0.004$), fully supporting H1 and aligning with the Technology Acceptance Model (TAM), which posits that perceived usefulness and ease of use drive effective technology adoption.

Second, the effect of Cloud-POS adoption on financial reporting accuracy ($\beta = 0.297$; $p = 0.047$) is significant but moderate—substantially weaker than its impact on efficiency. This gap is explained by the qualitative findings, particularly the digital pseudo-profit phenomenon driven by behavioral biases such as unrecorded withdrawals and omitted platform commissions. These findings suggest that technology adoption without corresponding improvements in accounting literacy and recording discipline leads to "digitalized disorder" rather than reliable financial reporting.

Third, accounting literacy (H3: $\beta = 0.351$; $p = 0.011$) and behavioral discipline (H4: $\beta = 0.312$; $p = 0.016$) emerge as key moderators of financial reporting accuracy. Notably, the coefficient for accounting literacy exceeds that of Cloud-POS adoption, reinforcing the argument that human factors play a more decisive role than technological capability in determining output quality.

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