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THE IMPACT OF ACCOUNTING KNOWLEDGE, EDUCATION LEVEL, AND BUSINESS SCALE ON ACCOUNTING INFORMATION UTILIZATION: EVIDENCE FROM AN ENVIRONMENTAL UNCERTAINTY CONTEXT

O IMPACTO DO CONHECIMENTO CONTÁBIL, DO NÍVEL DE EDUCAÇÃO E DA ESCALA DE NEGÓCIOS NA UTILIZAÇÃO DE INFORMAÇÕES CONTÁBEIS: EVIDÊNCIAS DE UM CONTEXTO DE INCERTEZA AMBIENTAL

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Abstract
This study aims to investigate the impact of accounting knowledge, education level, and business scale on the utilization of accounting information, with environmental uncertainty serving as a moderating factor. The population consisted of 954 MSME respondents across Indonesia, selected using random sampling. Data were collected via questionnaires and analyzed using Structural Equation Modeling with Partial Least Squares (SEM-PLS). The results demonstrate that accounting knowledge, education level, and business scale significantly affect the use of accounting information. Additionally, environmental uncertainty significantly moderates the relationships between accounting knowledge, education level, business scale, and the utilization of accounting information. This study provides actionable insights for MSME owners and policymakers. Enhancing accounting and education knowledge among MSME operators, as well as supporting business scaling, can improve the effective use of accounting information systems, especially under conditions of environmental uncertainty. This can lead to better decision-making, improved financial management, and increased MSME resilience in volatile markets. The novelty of this research lies in its integration of

Resumo
Este estudo tem como objetivo investigar o impacto do conhecimento contábil, nível de educação e escala de negócios na utilização de informações contábeis, com a incerteza ambiental servindo como fator moderador. A população consistiu em 954 respondentes de MPMEs em toda a Indonésia, selecionados por meio de técnicas de amostragem aleatória. Os dados foram coletados por meio de questionários e analisados usando Modelagem de Equações Estruturais com Mínimos Quadrados Parciais (SEM-PLS). Os resultados demonstram que o conhecimento contábil, o nível de escolaridade e a escala do negócio têm um impacto significativo no uso das informações contábeis. Além disso, a incerteza ambiental modera significativamente as relações entre o conhecimento contábil, o nível de escolaridade, a escala do negócio e a utilização das informações contábeis. Este estudo fornece insights acionáveis para proprietários de MPMEs e formuladores de políticas. Aumentar os conhecimentos contabilísticos e educacionais entre os operadores de MPMEs, bem como apoiar a expansão dos negócios, pode melhorar a utilização eficaz dos sistemas de informação contabilística, especialmente em condições de incerteza ambiental. Isto pode levar a uma

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environmental uncertainty as a moderating factor, offering a nuanced understanding of how contextual dynamics influence accounting information use in Indonesian MSMEs.

Keywords: Education Level. Business Scale. Accounting Knowledge. Accounting Information Utilization. Environmental Uncertainty.

melhor tomada de decisões, uma melhor gestão financeira e uma maior resiliência das MPMEs em mercados voláteis. A novidade desta investigação reside na integração da incerteza ambiental como fator moderador, oferecendo uma compreensão matizada de como a dinâmica contextual influencia a utilização da informação contabilística nas MPMEs indonésias.

Palavras-chave: *Nível de Educação. Dimensão da Empresa. Conhecimentos de Contabilidade. Utilização de Informações Contabilísticas. Incerteza Ambiental.*

1 INTRODUCTION

In Indonesia, the number of micro, small, and medium enterprises (MSMEs) reached approximately 65.5 million units in 2025, contributing 61.9% to the Gross Domestic Product (GDP) and absorbing more than 119 million workers, equivalent to about 97% of the national workforce. However, data from the Coordinating Ministry for Economic Affairs as of January 30, 2025, indicate that the contribution of MSMEs to national exports remains relatively limited, accounting for only 15.7% of total exports, despite their significant role in the domestic economy. This low export contribution highlights persistent gaps in competitiveness, market access, product quality, as well as technology utilization and digitalization (Coordinating Ministry for Economic Affairs, 2025).

However, MSME businesses often encounter significant challenges in their development, particularly in financing and business growth. Madan (2020) reported that approximately 60-70% of MSMEs lack access to bank financing, primarily because financial institutions rarely reach remote areas. Additionally, MSMEs face difficulties with financial reporting; these reports are not solely crucial for securing credit, but also for managing assets, liabilities, and capital, as well as guiding business continuity decisions (International Monetary Fund, Asia and Pacific Dept, 2024). The preparation of accurate and high-quality financial statements relies heavily on accounting knowledge, which is essential in this process (Adhitama et al., 2025). Accounting serves as a vital tool in managing financial reports for MSMEs. Despite this, many MSME

operators still rely on manual financial record-keeping due to limited knowledge of Accounting Information Systems (AIS). Manual methods, such as recording transactions in books or notes, increase the likelihood of errors during data entry or summation (Al Najjar et al., 2024). Furthermore, a considerable number of MSME managers lack awareness of what accounting information entails and the advantages it offers. Proper accounting information can deliver essential benefits, including operational insights, financial reporting, and management accounting data, which contribute significantly to the successful management of MSMEs.

A higher level of education provides individuals with greater information and insight, which can facilitate task execution and serve as a foundation for improved understanding and decision-making (Matar & Raudeliuniene, 2021). However, the diverse educational backgrounds of MSME operators, ranging from elementary to undergraduate levels, do not necessarily guarantee business success. Beyond educational attainment, MSME actors must also possess accounting knowledge. Such knowledge is crucial for effective decision-making within MSMEs (García-Vidal et al., 2025). The depth of accounting knowledge and experience directly influences the ability of MSME operators to manage their businesses effectively (Chimucheka et al., 2025). Furthermore, education plays a vital role in the development of quality human resources. Lower educational levels can negatively affect the accuracy and quality of financial reporting, as individuals with limited education may lack the necessary skills compared to those with higher academic qualifications. This is particularly relevant given that a solid educational foundation is often required to understand accounting principles comprehensively.

According to Melinda et al. (2025), business scale refers to a company's capacity to manage operations by considering factors such as total assets, number of employees, and revenue generated within an accounting period. Business scale reflects the growth stage of a company, as larger businesses typically employ more staff. Furthermore, the scale of a business significantly affects the utilization of accounting information. Research by Melinda et al. (2025) has shown a positive correlation between business scale and the preparation and use of accounting information, measured by indicators like revenue, employee count, and owned assets. As business complexity and scale increase,

the demand for accounting information to ensure business continuity also rises; conversely, smaller-scale businesses tend to require less accounting information.

Environmental uncertainty pertains to the insufficiency and timeliness of accounting information, which restricts decision-making and actions. In this scenario, the significance of high-quality accounting information for effective decision-making is heightened. As the unpredictability of events intensifies, organizations increasingly rely on strategic planning and the formulation of response strategies to address emerging threats and opportunities (Pires et al., 2023). The impact of environmental uncertainty on the utilization of accounting information and its function as a moderating variable has been explored through various studies. Some research focuses on examining the relationship between factors of environmental uncertainty and the relevance or usefulness of accounting information (Pires et al., 2023). However, it remains unclear whether environmental uncertainty influences the association between accounting knowledge, education level, business scale, and accounting information utilization, and whether it moderates these relationships. This study endeavors to address this research gap.

This study addresses a critical research gap by proposing an integrated theoretical framework based on organizational contingency principles. The framework investigates the direct influence of individual human capital (Accounting Knowledge and Education Level) and organizational capacity (Business Scale) on Accounting Information Utilization (AIU), specifically examining how these relationships are moderated by Environmental Uncertainty (EU). The structure seeks to establish a model of "fit," arguing that the positive effects of internal resources on AIU are significantly amplified when external turbulence (high EU) demands sophisticated and adaptive management practices.

2 LITERATURE REVIEW

2.1 Accounting Knowledge (AK) and Accounting Information Utilization (AIU)

Accounting Knowledge (AK) refers to an individual's ability to understand accounting principles, analyze financial statements, and interpret financial information

(Ruliana et al., 2024). Grounded in Human Capital Theory (HCT), accounting knowledge represents a form of specialized expertise that enhances managerial decision-making capacity (Becker, 1993). Managers with strong accounting knowledge are better equipped to prepare budgets, assess financial risks, analyze performance metrics, and utilize financial data effectively.

Under HCT, individuals' domain-specific knowledge (such as accounting knowledge) is an investment in their human capital, equipping them to interpret, analyze, and act upon accounting information more effectively. Managers or business owners possessing higher accounting knowledge are better able to understand financial statements, cost reports, and other accounting outputs, which enhances their ability to utilize that information for planning, budgeting, control, and decision-making (Unger et al., 2011). Several recent studies in the SME context confirm that accounting knowledge (or accounting training) significantly predicts the use of accounting information. For instance, Putra & Holisoh (2022) find that accounting expertise influences firms' performance, and this effect is contingent on environmental uncertainty. Moreover, Ruliana et al. (2024) report that accounting training and education levels significantly influence accounting information usage in micro, small, and medium enterprises. Therefore, we propose the following hypothesis:

H1: There is an influence of accounting knowledge on the use of accounting information.

2.2 Education Level (EL) and Accounting Information Utilization (AIU)

Education is another dimension of human capital. Higher formal education (e.g., tertiary education) enhances cognitive skills, analytical thinking, and the capacity to understand complex information. Managers or business owners with higher educational attainment are more likely to appreciate the structure, relevance, and value of accounting information, and therefore more likely to use it systematically in their decision-making processes. Education Level represents the highest formal educational attainment of the business owner or manager. Higher education enhances analytical capacity, logical reasoning, and the ability to interpret complex information. According to Human Capital

Theory, education increases individuals' ability to process and apply knowledge (Becker, 1993).

The utilization of accounting information is strongly impacted by individuals' educational level and proficiency in accounting. Owners with higher levels of education tend to be more competitive in the marketplace, achieve greater sales, and realize higher profits. This is attributed to their ability to apply knowledge acquired through their education to business operations (Zuhroh et al., 2025). A substantial educational background encourages MSME operators to improve business management by producing high-quality products and enhancing market competitiveness, which subsequently boosts productivity and overall business performance (Keelson et al., 2024). Generally, entrepreneurs with higher education are better prepared to develop strategic plans essential for business sustainability due to the knowledge and skills gained during their educational journey (Klucznik-Törő, 2021). Consequently, it is reasonable to assert that education level significantly influences accounting information use. According to Díaz-Venegas et al. (2019), their findings indicate that the level of education affects individuals' thoughts, behaviors, and actions. Thus, we propose the following hypothesis:

H2: Education Level (EL) is positively associated with Accounting Information Utilization (AIU).

2.3 Business Scale (BS) and Accounting Information Utilization (AIU)

Business Scale (BS) acts as a critical contextual factor within Contingency Theory (CT), strongly predicting the formalization and intensity of AIU. Larger companies inherently face greater organizational complexity, wider geographical scope, and increased regulatory scrutiny compared to their smaller counterparts (Horvat & Mojzer, 2019). This complexity necessitates highly formalized structures, including dedicated controlling services and comprehensive, standardized AIS (Binha et al., 2020).

Business Scale refers to firm size measured through revenue, number of employees, or asset base. According to the Resource-Based View (RBV), firm size determines the availability of resources necessary for adopting accounting systems and utilizing information effectively (Barney, 1991). Larger firms typically have more

formalized structures, trained personnel, and standardized processes, all of which support AIU. According to Contingency Theory (CT), larger scale is a proxy for organizational complexity and resource capacity, necessitating formalized, comprehensive AIU systems and specific internal controlling functions.

Empirical studies consistently confirm that larger business scale increases the likelihood of accounting system adoption and accounting information use. For instance, Zotorvie et al. (2025) found that SMEs with larger operational scales show higher levels of accounting practices due to greater operational complexity and resource capacity. As firms grow, the need for detailed financial reporting and performance monitoring increases, making AIU essential for strategic planning and control. Thus, we propose the following hypothesis:

H3: Business Scale (BS) is positively and significantly related to Accounting Information Utilization (AIU).

2.4 The Interaction of Environmental Uncertainty (EU) with Accounting Knowledge (AK) and Accounting Information Utilization (AIU)

Environmental Uncertainty (EU) refers to unpredictability in the external environment, including changes in customer demand, technology, competition, and government regulations (Chenhall & Moers, 2015). Contingency Theory (CT) argues that organizations must adapt their information systems to the external environment to maintain effectiveness. High EU increases the need for timely, broad-scope accounting information to facilitate planning, forecasting, and risk management. Several studies highlight the EU as a moderator of the relationship between organizational characteristics and accounting information systems. For example, Kesumawati et al. (2019) found that the EU strengthens the relationship between management accounting systems and performance. Similarly, Alawattage et al. (2007) found that firms in uncertain environments rely more heavily on accounting information for strategic decisions. However, some research indicates that under extreme uncertainty, overly rigid accounting systems may hinder flexibility (Moll & Yigitbasioglu, 2019). Thus, the moderating role of the EU remains a subject of empirical debate, making it a significant factor for analysis in this study.

High EU increases the demand for strategic, non-financial information. Superior AK is the indispensable resource (RBV) needed to extract value from AIU under this external pressure (CT). The evidence suggests that environmental uncertainty enhances the positive effect of information system usage on individual performance (Dwirandra & Astika, 2020). This effect is primarily due to the user's ability (AK) to convert information volatility into actionable decisions. When uncertainty is high, the capability to strategically modify, automate, and quickly interpret tailored reports becomes a crucial differentiator, thereby strengthening the positive slope of the AK on AIU relationship. High EU increases the demand for strategic, non-financial information. Superior AK is the indispensable resource (RBV) needed to extract value from AIU under this external pressure (CT). Thus, we propose the following hypothesis:

H4: Environmental Uncertainty moderates the relationship between Accounting Knowledge and Accounting Information Utilization.

2.5 The Interaction of Environmental Uncertainty (EU) with Education Level (EL) and Accounting Information Utilization (AIU)

Contingency Theory (CT) argues that the effectiveness and relevance of accounting information depend on contextual factors. Environmental Uncertainty (EU)—including unpredictability in markets, customer demand, technology, and regulation—affects managers' information needs and the processes through which information is interpreted and applied. Under high uncertainty, firms require more timely, flexible, and detailed information to respond effectively to external changes.

In conditions of high uncertainty, managers depend more heavily on personal skills and judgment to interpret ambiguous or incomplete information. Thus, individuals with superior higher education should rely more on accounting information when facing volatile conditions. This suggests that the EU strengthens the positive influence of education level on AIU. A higher EL implies superior managerial ability and institutionalized competence, which is highly valued when external pressure mounts. Research, grounded in CT, indicates that adequate managerial ability (a proxy for high EL) can weaken or mitigate the negative effects of environmental uncertainty on organizational behavior, such as reducing the impact of EU on practices like earnings

management (Iswajuni & Luke, 2023). Empirical support for this mechanism has been observed in several recent studies. Pires & Alves (2022) found that environmental uncertainty increases the perceived value of broad-scope and timely accounting information. Likewise, Pires et al. (2023) reported that accounting information becomes more relevant under high uncertainty, especially when managers possess the skills necessary to interpret such information. Thus, we hypothesize the following:

H5: Environmental Uncertainty moderates the relationship between Education Level and Accounting Information Utilization

2.6 The Interaction of Environmental Uncertainty (EU) with Business Scale (BS) and Accounting Information Utilization (AIU)

This apparent conflict often arises from the definition and measurement of Accounting Information Utilization. Studies that define AIU narrowly—focusing only on internal compliance, routine reporting, or traditional financial metrics—may fail to detect the moderation effect. As prescribed by CT, high EU necessitates a shift toward the utilization of non-financial and external information (Saraphine et al., 2025). When research specifically measures the utilization of strategic management accounting techniques or the relevance of non-financial information for decision-making purposes, the moderating effect of EU on performance tends to become highly significant (Pires & Alves, 2022).

Large BS provides the organizational formality, resources, and structural resilience (CT factor) necessary to successfully deploy and leverage AIU to monitor and react to market volatility. The moderating role of the EU on the relationship between BS and AIU is more nuanced. On one hand, large firms—due to their greater resources—may benefit more from accounting information during uncertain periods. Their formal systems, analytical staff, and established reporting mechanisms may become even more valuable when environmental turbulence increases. Under this logic, the EU strengthens the size effect. On the other hand, some research suggests that formal systems in larger firms may be too rigid to adapt to rapidly changing environments. Pires & Alves (2022) found evidence suggesting that environmental uncertainty can weaken the effect of organizational competencies, including accounting expertise, due to the need for

flexibility and rapid response. Under this view, formal accounting systems in larger firms may provide information that is too aggregated or too delayed for highly turbulent environments, thereby weakening the basis for the AIU relationship. Thus, we propose the following hypothesis:

H6: Environmental Uncertainty moderates the positive relationship between Business Scale and Accounting Information Utilization.

3 RESEARCH DESIGN

This study employs a quantitative, explanatory research design using a structured survey to test relationships between variables. Quantitative design is selected because it allows hypothesis testing, generalization from sample to population, and statistical modeling through Structural Equation Modeling (SEM). The parameter estimation for SEM-PLS was performed using WarpPLS 7. A cross-sectional approach is used, where data are collected at a single point in time from SME owners and managers. This design is consistent with prior accounting and SME research (Pires & Alves, 2022; Quoc Trung, 2021). The target population includes owners, managers, and financial administrators of micro, small, and medium enterprises (MSMEs) operating in Indonesia. MSMEs are selected because they commonly face challenges related to accounting knowledge, resource constraints, and environmental uncertainty.

A purposive sampling method is used, with inclusion criteria: (1) The respondent must be the owner, manager, or financial decision-maker of an MSME; (2) The business must have been operational for at least one year; and (3) The respondent must have interacted with financial or accounting information. Purposive sampling ensures that only respondents with relevant knowledge answer the questionnaire. Data are collected using a structured questionnaire administered through online and offline distribution channels. Respondents answer on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The survey garnered a total of 965 responses. After the first review, flawed surveys were removed from the data set due to short completion times and random patterns, leaving 954 complete responses and an effective response rate of 98.86%.

4 RESULT AND DISCUSSION

4.1 Respondent characteristics

Table 1

Respondent Characteristics

Demographic	Option	Frequency	Percentage (%)
Position	Owner	572	59.95
	Managers	238	24.94
	Accounting/Finance Staff	144	15.09
Business Type	Services	382	40.04
	Retail	286	29.97
	Manufacturing	190	19.91
	Others	96	10.06
Years in Operation	< 1 year	96	10.06
	1-3 years	334	35.01
	3-5 years	286	29.97
	>5 years	238	24.94
Number of Employees	1-5	429	44.96
	6-20	334	35.01
	21-50	143	14.98
	>50	48	5.03

Table 1 presents the descriptive statistics for the study sample (954). The demographic profile encompasses organizational position, industry sector, years of operation, and total workforce size. Regarding respondent roles, business owners constituted the primary participant group. Within the sectoral distribution, the service industry represented the largest cohort (40%), followed by retail (29.97%) and manufacturing (19.91%). In terms of organizational maturity, 35% of the surveyed enterprises had been in operation for one to three years. Finally, the majority of participating firms were classified as micro-enterprises, typically employing between one and five individuals.

4.2 Measurement model evaluation

4.2.1 Validity and reliability test

To evaluate the convergent and discriminant validity of the conceptual measures, this study adopted the procedures established by Anderson and Gerbing (1988), Burnkrant and Page (1982), and Chin (1995). Following the recommendations of Burnkrant and Page (1982) and Chin (1995), convergent validity is confirmed when the average variance extracted (AVE) and factor loadings exceed the 0.5 threshold. As presented in Table 2, all constructs demonstrated robust internal consistency, with Cronbach's alpha and composite reliability (CR) values surpassing the 0.70 benchmark. Consequently, the measurement model is deemed both valid and reliable.

Table 2

Validity and Reliability Test

Variable and Indicators	Loading	CA (α)	CR	AVE
Accounting Knowledge (AK)		0.902	0.923	0.632
AK1	0.767			
AK2	0.851			
AK3	0.872			
AK4	0.732			
AK5	0.754			
AK6	0.754			
AK7	0.806			
Education Level (EL)		0.876	0.910	0.670
EL1	0.832			
EL2	0.721			
EL3	0.819			
EL4	0.852			
EL5	0.862			
Business Scale (BS)		0.785	0.854	0.543
BS1	0.581			
BS2	0.782			
BS3	0.769			
BS4	0.733			
BS5	0.799			
Environmental Uncertainty (EU)		0.853	0.890	0.543
EU1	0.795			
EU2	0.657			
EU3	0.664			
EU4	0.841			

EU5	0.851			
EU6	0.872			
EU7	0.638			
Accounting Information Utilization (AIU)		0.878	0.907	0.586
AIU1	0.804			
AIU2	0.728			
AIU3	0.781			
AIU4	0.769			
AIU5	0.799			
AIU6	0.763			
AIU7	0.448			

Discriminant validity was assessed using the dual criteria of squared correlations and cross-loadings (Chin, 1995). The analysis revealed that the squared correlations between constructs were consistently lower than the individual AVE scores; furthermore, all factor loadings surpassed the 0.50 threshold. Consequently, the data presented in Table 3 provide empirical support for the discriminant validity of the latent variables.

Table 3

Correlations among latent variables with the square roots of AVEs

	AK	**EL**	**BS**	**AIU**	**EU**	**EU*BS**	**EU*AK**	**EU*EL**
AK	0.795	0.884	0.728	0.711	0.276	-0.542	-0.519	-0.524
EL	0.884	0.819	0.722	0.692	0.256	-0.536	-0.518	-0.509
BS	0.728	0.722	0.737	0.634	0.339	-0.576	-0.561	-0.56
AIU	0.711	0.692	0.634	0.765	0.428	-0.543	-0.538	-0.536
EU	0.276	0.256	0.339	0.428	0.737	-0.539	-0.566	-0.557
EU*BS	-0.542	-0.536	-0.576	-0.543	-0.539	1	0.983	0.981
EU*AK	-0.519	-0.518	-0.561	-0.538	-0.566	0.983	1	0.993
EU*EL	-0.524	-0.509	-0.56	-0.536	-0.557	0.981	0.993	1

Note: Square roots of average variances extracted (AVEs) are shown on the diagonal.
AK: Accounting Knowledge; EL: Education Level; BS: Business Scale; AIU: Accounting Information Utilization; EU: Economic Uncertainty

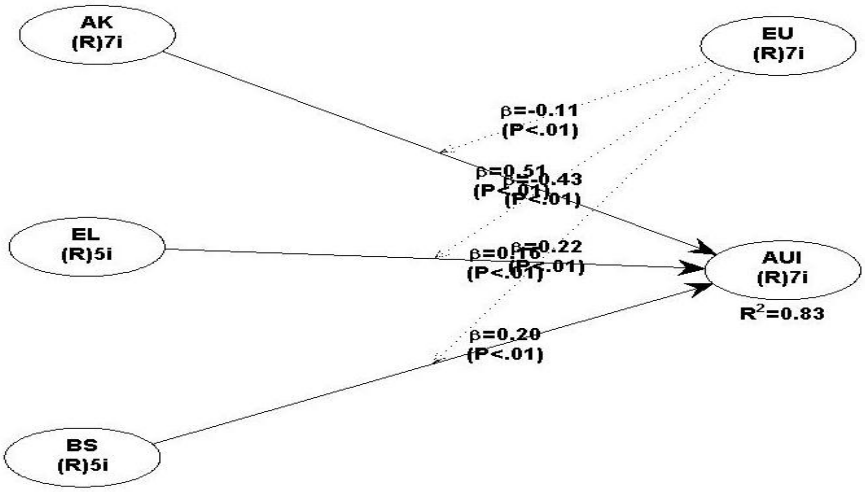
4.3 Structural model evaluation

Variance inflation factor (VIF) values ranged from 1.20 to 2.95, below the threshold of 5.0, confirming no multicollinearity issues. The R^2 for the dependent variable AIU was 0.83. This indicates that 83% of the variance in accounting information utilization is explained by the exogenous variables.

4.3.1 Hypothesis testing (Path Coefficients)

Figure 2

Inner Model



Note: AK: Accounting Knowledge; EL: Education Level; BS: Business Scale; AIU: Accounting Information Utilization; EU: Economic Uncertainty

The structural model was evaluated to determine the significance of the hypothesized relationships between exogenous and endogenous variables. Path coefficients were analyzed to assess both the magnitude and statistical significance of the parameters, providing empirical evidence for the strength of these associations. Hypotheses were tested at the 1%, 5%, and 10% levels; the resulting decisions regarding their acceptance or rejection are summarized in Figure 2.

4.3.2 The result of direct effect

This study examined the influence of accounting knowledge, education level, and business scale on accounting information utilization (AIU) among SMEs, while assessing the moderating effect of environmental uncertainty. The results provide several important insights into how individual competencies, organizational characteristics, and contextual pressures jointly shape the use of accounting information in managerial decision-making. By synthesizing Human Capital Theory (HCT), the Resource-Based

View (RBV), and Contingency Theory (CT), we can explain not only why certain SMEs utilize more information but also how environmental pressures catalyze this process.

First, based on Table 4, the findings show that accounting knowledge has a significant positive effect on the utilization of accounting information (H1 supported). This aligns with previous studies, which have shown that individuals with a higher understanding of accounting principles are more capable of interpreting financial reports and applying them in operational and strategic decisions (Ismail & King, 2007). From the lens of Information Processing Theory, accounting knowledge enhances an individual's ability to process complex financial data. Knowledgeable business owners or staff demonstrate greater confidence and capability in transforming accounting data into useful insights. This suggests that human capital competence is a central driver of information use, which is consistent with RBV's argument that knowledge resources lead to improved decision quality.

Table 4

Direct Effect

Hypothesis	Path	β	p-value	Result
H1	AK → AIU	0.514	<0.001	Supported
H2	EL → AIU	0.156	<0.001	Supported
H3	BS → AIU	0.201	<0.001	Supported

The results, which confirm the positive influence of Accounting Knowledge (AK) on AIU, validate the core tenets of Human Capital Theory. The finding also supports the assertion that accounting knowledge is a "domain-specific" investment (Becker, 1975). As suggested by Anasthasya et al. (2022) and Hasiara et al. (2025), this knowledge serves as the cognitive bridge between raw data and strategic action. Our results echo (Cuc et al., 2025), identifying the human element as the primary predictor of system use; without the literacy to interpret cost reports or budgets, the most sophisticated systems remain idle.

Second, the results indicate that education level also positively influences the utilization of accounting information (H2 supported). Prior literature similarly notes that education enhances analytical capacity and strategic reasoning (Díaz-Venegas et al., 2019; Tran Thanh Thuy, 2025). Higher education provides exposure to analytical tools,

logical reasoning, and financial literacy basics. These competencies allow SME managers or owners to understand financial reports better and integrate them into managerial activities such as planning, controlling, and evaluating performance. The finding supports the Theory of Planned Behavior, as higher education increases perceived behavioral control, thereby increasing the likelihood of using accounting information in decision-making.

The results, which confirm the positive influence of Education Level (EL) on AIU, validate the core tenets of Human Capital Theory. The positive impact of EL aligns with the idea that formal education enhances "perceived behavioral control" (Ajzen, 1991) and analytical reasoning. Supporting (Tran Thanh Thuy, 2025), our findings suggest that higher education equips managers with the mindset to handle modern internal control systems. This validates the link between general cognitive capacity and the "institutionalization" of best practices in SMEs.

Third, the analysis reveals that business scale significantly predicts the use of accounting information (H3 supported). Larger SMEs—those with more employees, greater revenue, or more operational divisions—tend to use accounting information more extensively. As businesses grow, their operational complexity increases, and reliance on timely, accurate information becomes essential. This is consistent with Contingency Theory, which posits that organizational size necessitates more formal and structured information systems (Donaldson, 2014). This is aligned with prior findings that larger SMEs adopt accounting systems more readily due to increased managerial demands (Nelson Maseko, 2011; Quoc Trung, 2021).

This finding confirms the application of the Resource-Based View and Contingency Theory. In line with (Barney et al., 2021; Mikalef & Gupta, 2021), larger SMEs in this study leveraged their superior resource endowment to implement more sophisticated AIS. As firms grow, "intuitive" management becomes a liability. Our findings support (Horvat & Mojzer, 2019), suggesting that increased scale creates a structural "requirement" for formalized accounting to manage multiple revenue streams and varied transactions. This confirms that AIU is not just a choice but a necessary response to organizational complexity.

4.3.3 The moderating effect of Environmental Uncertainty (EU)

Hypothesis 4 predicted that Environmental Uncertainty (EU) would moderate the relationship between Accounting Knowledge (AK) and Accounting Information Utilization (AIU). Our results confirm the moderation but reveal a negative (weakening) interaction. This finding suggests that as the environment becomes increasingly volatile, the ability of managers to leverage their technical accounting expertise to drive information utilization is diminished. From the perspective of Cognitive Load Theory, as environmental uncertainty increases—characterized by rapid market shifts and unpredictable competitor moves—the complexity of decision-making rises exponentially. While AK provides the technical foundation to utilize accounting data, high uncertainty often renders historical financial data less predictive. Previous research by Hall (2010) suggests that in volatile contexts, managers may experience "information overload," where the technical precision of their accounting knowledge becomes a bottleneck rather than an asset.

Table 5

Moderating Effect

Hypothesis	Path	β	p-value	Result
H4	AK → EU→ AIU	-0.114	0.005	Supported
H5	EL → EU → AIU	-0.432	<0.001	Supported
H6	BS →EU→ AIU	0.220	<0.001	Supported

In stable environments, a manager's technical expertise enables a direct and methodical application of accounting tools. However, under high EU, the "relevance-reliability" tradeoff shifts. The weakening effect observed here suggests that even highly knowledgeable managers struggle to apply traditional accounting frameworks when the underlying economic assumptions are constantly evolving. This aligns with the findings of Chenhall (2003) in Contingency Theory, which posits that technical accounting systems may become less effective when the external environment is too turbulent to allow for standard measurement and control.

From a theoretical standpoint, this can be explained by the limitations of historical data in predicting chaotic futures. According to Human Capital Theory (HCT),

specialized knowledge like AK provides the technical literacy required for sophisticated management accounting. However, in highly uncertain contexts—characterized by rapid market shifts and regulatory flux —traditional accounting information often loses its "predictive value." Research by Chenhall (2003) and Hall (2010) indicates that when external conditions are too turbulent, the technical precision of accounting knowledge can lead to "information overload." In these scenarios, managers may find that the structured cost concepts and measurement techniques they are experts in are less effective for decision-making, causing them to rely more on intuition or external qualitative data rather than formal accounting reports.

Similarly, the relationship between Education Level (EL) and AIU was found to be significantly weakened by high levels of Environmental Uncertainty. While a higher EL generally enhances the cognitive capacity for abstract reasoning and information literacy, its impact on actual AIU decreases as the environment becomes more unpredictable. This phenomenon aligns with the concept of Bounded Rationality. Higher education levels typically instill a systematic and analytical approach to decision-making. However, Upper Echelons Theory (Hambrick & Mason, 1984) suggests that when uncertainty reaches extreme levels, these rational models often reach their limits. Previous studies, such as those by Quoc Trung (2021) and Pires & Alves (2022), have noted that in volatile environments, the "information deficit" becomes so large that even highly educated managers may struggle to effectively synthesize diverse data streams. As a result, the "marginal utility" of high EL—which is very apparent in stable conditions—is reduced during turbulence because the formal accounting systems they are trained to use may not provide the timely, external indicators needed for strategic survival.

In contrast, H6 was moderated and strengthened. This indicates that the interaction between Business Scale and Environmental Uncertainty creates a synergistic effect on AIU. Unlike individual human traits, which may falter under extreme stress, large organizational structures react to uncertainty by tightening their control mechanisms. When faced with high EU, large firms leverage their "Resource Depth" (Saraphine et al., 2025) to increase the frequency and sophistication of their accounting reports. For these entities, uncertainty acts as a catalyst that mandates the use of timely, sophisticated data to navigate market shifts. This supports the Contingency

Theory perspective: the "fit" between a large-scale structure and a volatile environment is achieved through the intensified utilization of accounting information as a stabilizer.

5 CONCLUSION

This research concludes that both individual human capital and organizational structural factors are essential determinants of Accounting Information Utilization (AIU). The findings demonstrate that Accounting Knowledge (AK), Education Level (EL), and Business Scale (BS) significantly and positively influence the extent to which firms rely on accounting data for decision-making. However, the study reveals a critical nuance: the effectiveness of these drivers is not universal but is contingent upon the level of Environmental Uncertainty (EU). While uncertainty strengthens the role of organizational scale—enabling larger firms to leverage their resource depth for resilience—it paradoxically weakens the impact of individual traits like knowledge and general education. This suggests that in highly volatile environments, the "predictive power" of internal accounting systems may reach a cognitive limit for human decision-makers, even those with high expertise.

This study contributes to Contingency Theory and the Resource-Based View (RBV) by mapping the interaction between internal capabilities and external volatility. It clarifies that human capital is not a static asset; its utility for information processing fluctuates depending on environmental stability. Furthermore, it provides empirical evidence for the "Resource Depth" perspective, showing that business scale acts as a vital buffer that intensifies AIU when the external context becomes unpredictable. For SME owners and practitioners, the results suggest that investing in accounting expertise is most effective for routine decision-making in stable markets. However, during periods of high uncertainty, firms should not rely solely on individual "cognitive brilliance" but should lean into formalized reporting structures and systemic tools associated with larger scales to maintain strategic control. Practitioners are encouraged to develop "flexible" accounting systems that can incorporate external indicators to better support decision-makers when traditional data feels insufficient.

Despite its contributions, this study has several limitations. The data was collected at a single point in time, which limits the ability to observe how AIU evolves as a firm

moves through different phases of environmental volatility. This study focused on knowledge and education, but other psychological factors, such as "risk appetite" or "technological readiness," were not explored. Future research could employ a longitudinal design to track how SMEs adapt their information utilization patterns over several years. Additionally, future studies should investigate the role of Digital Transformation (e.g., AI and Big Data) as a possible mechanism to bridge the gap between individual knowledge and environmental complexity.

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Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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