

The Quality of AIS and HR Information as Determinants of Managerial Decision Effectiveness Moderated by Business Environmental Uncertainty

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ABSTRACT

The MSME business environment is characterized by uncertainty, which demands rapid and accurate managerial decision-making. This study aims to examine the influence of Accounting Information Systems (AIS) and HR Competence on Managerial Decision-Making Effectiveness (DEM), as well as the role of Environmental Uncertainty (EUR) as a moderating variable. A quantitative method using the Moderated Regression Analysis (MRA) approach was used, involving 181 MSME respondents. The results of the study indicate that AIS and HR Competence partially have a significant and positive effect on EPKM. The contribution of the influence of both variables reaches 73.5% ($R^2 = 0.735$). Specifically, Environmental Uncertainty is proven to moderate and strengthen the influence of AIS on EPKM (Sig. interaction: 0.000). This indicates that in an uncertain environment, the quality of AIS becomes increasingly important and has a greater driving force in increasing the effectiveness of managerial decision-making. This moderation model is able to explain variations in EPKM up to 77.3%

INTRODUCTION

The modern business environment is characterized by increasing levels of uncertainty, a phenomenon fueled by massive technological change, aggressive competitive dynamics, volatile market demand, and the inevitable acceleration of digitalization. These conditions require every organization, especially Micro, Small, and Medium Enterprises (MSMEs), to be able to make managerial decisions that must be fast, accurate, and adaptive to changing contexts. In Indonesia, the government's push for MSME digital transformation is very strong, with the Ministry of Communication and Information Technology (Kominfo) targeting 30 million MSMEs connected to the digital ecosystem by 2024. However, the reality on the ground shows that of the approximately 64.2 million MSMEs, only about 25.42 million (around 32%) have been connected, and even fewer are truly utilizing digital technology optimally in their operations and decision-making. This condition indicates a gap, and most MSMEs still face obstacles in optimizing their technology and human resources to support Effective Managerial Decision Making (EPKM) amidst external pressures in the form of environmental uncertainty.

Amidst this uncertainty, the availability of quality information is a crucial factor in maintaining competitiveness. Bank Indonesia data and an INDEF survey confirm that digitalization is positively correlated with increased efficiency, transaction growth, and increased sales for MSMEs. Accounting Information Systems (AIS) are a central component responsible for providing accurate, timely, and relevant financial and non-financial information to managers. Research by Sriningsih et al. (2025) shows that accounting digitization not only increases efficiency but also reduces MSME operational costs, demonstrating the importance of quality AIS. However, the quality of information produced by an AIS is not solely determined by technological sophistication but also depends heavily on the competence of the human resources (HR) who operate and utilize it. The low digital literacy of MSMEs indicates that without competent HR, the AIS is at risk of producing inaccurate data, thus weakening EPKM. Therefore, losses due to poor information can range from misallocation of resources to non-adaptive strategies.

This study comprehensively integrates and tests two key internal determinants, namely AIS Information Quality and Human Resource Competence, towards EPKM, while also incorporating Environmental Uncertainty (KL) as a contextual factor. Previous studies have shown that assessing AIS and HR separately, focusing less on AIS information quality, and minimally using KL as a contextual variable. This study will bridge this gap through an integrated model that positions AIS Information Quality and Human Resource Competence as the main determinants of EPKM, the urgency of which is reinforced by the condition of KL.

The grand theory in this research is the Theory of Reasoned Action (TRA) approach and the Technology Acceptance Model (TAM) explaining that the perception of system usefulness is strongly influenced by the beliefs and abilities of human resources. The Resource-Based View (RBV) supports that reliable AIS and competent human resources are strategic resources that create competitive advantage. Meanwhile, Contingency Theory (Lawrence & Lorsch, 1967; Otley,

1980) is the main foundation of the moderating role, where the effectiveness of internal systems (AIS and HR) depends on their suitability to the environment. High KL increases the need for detailed, fast, and flexible information (Pires & Alves, 2022; Nur Firdausy et al ., 2022), thus the role of AIS and HR is stronger. Various previous studies have confirmed this direct relationship (Mustamin et al ., 2025; Firman & Sriningsih, 2025; Hanifah & Wahyudi, 2024).

Thus, the purpose of this research is to develop an integrated model by testing KL as a contextual variable that strengthens the relationship between internal determinants (AIS and HR) and EPKM in the context of MSMEs.

This research aims to:

1. Analyze and test the influence of AIS information quality on the effectiveness of managerial decisions.
2. Analyze and test the influence of HR competencies on the effectiveness of managerial decisions.
3. Explains the role of environmental uncertainty as a context that strengthens the urgency of information quality and HR competency in decision making.

The expected contributions and benefits of this research are

- a. Theoretical Benefits: enriching the AIS literature and decision making through multidimensional integration of Contingency Theory, RBV, and IS Success Model;
- b. Practical Benefits: producing strategic recommendations for MSME managers, government, and business partners in formulating investment priorities in information systems and HR competency development to face an increasingly uncertain environment.

LITERATURE REVIEW

1. Accounting Information Systems (AIS) and Information Quality

An AIS is defined as an integrated system (people, procedures, and technology) for collecting, processing, and distributing financial and non-financial information to support decision-making (Romney & Steinbart, 2018). Its primary function has shifted from mere record-keeping to providing real-time information for planning, coordination, and control. The success of an AIS depends heavily on Information Quality, which is determined by fundamental characteristics such as accuracy, relevance, completeness, timeliness, and verifiability (Bodnar & Hopwood, 2014). High-quality information plays a vital role in reducing uncertainty and optimizing managerial decision choices, especially in the resource-constrained environment of MSMEs.

2. Human Resources (HR) and the Effectiveness of Managerial Decisions

Human resource competency is a dominant factor determining the success of AIS utilization. This competency includes technical skills, digital literacy, and analytical abilities (Mathis & Jackson, 2016). The quality of human resources acts as a determinant that strengthens the relationship between information quality and decision effectiveness, because advanced technology requires users who are able to operate, validate data, and critically interpret system results. Managerial Decision Effectiveness itself is the process of selecting the best alternative supported by accurate, relevant, and timely information (Simon, 1997). For MSMEs, good decision effectiveness improves managers' ability to respond to market changes and implement strategies effectively.

3. Business Environment and Environmental Uncertainty

The business environment is an external system (general and specific) that influences an organization's strategy and performance (Robbins & Coulter, 2018; Wheelen & Hunger, 2018). Environmental Uncertainty (OS) becomes a central issue as the environment becomes increasingly dynamic, complex, and unpredictable (Daft, 2016). In high OS situations, organizations require much more accurate and rapid information to reduce decision risks (Simons, 1995). Digitalization (Laudon & Laudon, 2020) accelerates the transformation of the business environment, thus encouraging MSMEs to adopt more effective information systems and requiring competent human resources (Scarborough, 2017).

4. Grand Theory as a Foundation

a. Theory of Reasoned Action (TRA)

The TRA (Fishbein & Ajzen, 1975) explains that the quality of AIS information influences managers' attitudes toward its use. Information perceived as accurate creates positive attitudes, which then strengthen managers' intentions to use the information in decision-making. HR competencies also shape subjective norms that support the use of quality information, especially in uncertain environmental conditions.

b. Contingency Theory

Contingency Theory (Lawrence & Lorsch, 1967; Otley, 1980) is the main foundation of this research. This theory states that the effectiveness of internal systems (AIS and HR) depends on their alignment with external environmental conditions (Environmental Uncertainty). The higher the Environmental

Uncertainty, the greater the organization's need for detailed, timely, and flexible information to support managerial decisions. Thus, alignment between AIS, HR, and environmental dynamics is a prerequisite for decision effectiveness.

5. Previous Studies

Various previous studies consistently support the framework of the relationship between independent and dependent variables in this study, particularly regarding the central role of Accounting Information Systems (AIS) and HR Competence on the Effectiveness of Managerial Decision Making (EPKM). In the AIS aspect, a fundamental study by Susanto & Meiryani (2021) found that system quality and information quality are determining factors that result in more accurate decisions. This was reinforced by Nugroho & Darmawan (2022) in the specific context of MSMEs, who showed that AIS adoption increases the speed and accuracy of decisions. The synergy between these two main variables was confirmed by Firman & Sriningsih (2025) and Mustamin et al. (2025), who concluded that EPKM increases significantly with the presence of AIS and qualified HR. Meanwhile, HR Competence is also recognized as a determinant pillar, where Hanifah & Wahyudi (2024) prove that competent HR is able to improve the use of technology for decision-making processes, supported by Sriningsih & Mustamin (2024) who emphasize that mastery of information by HR results in higher quality decisions, complementing the role of AIS supported by Sriningsih, Syam & Mustamin (2025) regarding digitalization.

The relationship between these variables becomes increasingly complex and important when associated with external factors of Environmental Uncertainty (KL), which is the main moderating variable and has strong justification from previous studies; Pires & Alves (2022) emphasize that environmental uncertainty increases the need for relevant accounting information, demands a more detailed and flexible management AIS as shown by Nur Firdausy, Bastian & Fitriyani (2022), and requires a more effective AIS (Putra, Pasupati & Larasdiputra, 2023). In particular, the findings of Gulo, Astuty & Hani (2024) regarding the influence of KL on managerial performance through AIS quality (as a mediator) provide a solid basis for this study to test and predict that KL will strengthen the relationship between AIS and EPKM, in line with the principles of Contingency Theory.

METHODOLOGY

This study uses a quantitative approach with an explanatory research type (Byrne, 2016), which aims to explain the causal relationship between the variables tested through testing the formulated hypotheses. The target of this study is Micro, Small, and Medium Enterprises (MSMEs) in South Sulawesi Province, with a planned sample size of 181 respondents. Primary data was obtained through the distribution of instruments in the form of a closed questionnaire based on a Likert scale (1-5), which was carried out both directly and through online media (online form) for efficiency in reaching respondents. All data collected were then processed and analyzed statistically using SPSS, which will be applied to test the influence and relationship between variables consisting of Accounting Information Systems (AIS), HR Competence, Environmental Uncertainty, and Effectiveness of Managerial Decision Making.

RESULTS AND DISCUSSION

A. Descriptive Statistical Tests and Classical Assumptions

In general, the results of descriptive statistical tests indicate that the variables of Accounting Information System (AIS) Information Quality, Human Resource Competence, Environmental Uncertainty, and Managerial Decision Making Effectiveness (EPKM) are in the high category, indicating that MSME respondents in South Sulawesi have a good perception of the quality of their systems and human resources, even though they are faced with an uncertain business environment. Before hypothesis testing, all regression models have met the classical assumptions (Normality, Multicollinearity, and Heteroscedasticity), ensuring that the resulting regression estimates are BLUE (Best Linear Unbiased Estimator).

B. Partial and Simultaneous Hypothesis Testing

The results of Multiple Linear Regression Analysis show that:

1. Partial Effect (t-Test)

The quality of AIS information (X1) is partially proven to have a significant and positive effect on the effectiveness of managerial decision-making (Y). Similarly, HR competency (X2) is also partially proven to have a significant and positive effect on the effectiveness of managerial decision-making (Y). Both partial hypotheses are accepted.

2. Simultaneous Effect (F Test)

The quality of AIS information (X1) and HR competency (X2) simultaneously have a significant effect on the effectiveness of managerial decision making (Y).

3. Coefficient of Determination (R²)

The contribution of the simultaneous influence of the two independent variables (X1 and X2) on EPKM (Y) reached 73.5% ($R^2=0.735$), while the remainder was influenced by other factors outside the model.

C. Testing the Moderation Hypothesis

The results of the Moderated Regression Analysis (MRA), which included the interaction variables of AIS Information Quality (X1), Environmental Uncertainty (Z), showed highly significant findings:

1. Environmental Uncertainty (Z) is statistically proven to moderate and strengthen the positive influence of AIS Information Quality (X1) on Managerial Decision Making Effectiveness (Y) (Significance of interaction: 0.000).
2. This moderation effect causes an increase in the model's Determination Coefficient (R²), where the regression model inserted with the moderating variable is able to explain the variation in Managerial Decision Making Effectiveness (Y) up to 77.3%.

AIS Information Quality and Managerial Decision Effectiveness

Information quality in AIS has a positive and significant impact on EPKM. Information quality (accuracy, relevance, and timeliness) directly reduces information uncertainty, which is a crucial component in the intelligence and design stages of decision-making (Simon, 1997). For MSMEs, valid and real-time information from AIS enables managers to respond to market dynamics with

more calibrated strategic decisions, in line with the findings of Susanto & Meiryani (2021) .

Human Resource Competence and Managerial Decision Effectiveness

The research results also support the hypothesis that HR Competence has a significant influence on EPKM. This finding confirms the principle of the Resource-Based View (RBV) , where competent human resources, especially in digital literacy and analytical skills, are a competitive advantage. No matter how sophisticated AIS technology is, it will not provide maximum benefits without human resources capable of operating, validating input, and critically interpreting information output. Thus, HR Competence acts as an enabler that ensures quality information from AIS can be translated into effective decisions, strengthening the findings of Hanifah & Wahyudi (2024) .

The Crucial Role of Moderating Environmental Uncertainty

The most important finding and the core of this study is the evidence that Environmental Uncertainty (EQ) strengthens the influence of AIS Information Quality on EPKM. This result empirically supports Contingency Theory (Lawrence & Lorsch, 1967). In increasingly dynamic, complex, and unpredictable environments (high EQ), the pressure to make quick and accurate decisions increases sharply. Under these circumstances, MSME managers can no longer rely solely on intuition but are forced to utilize high-quality accounting information (X1) as the only reliable information anchor. EQ acts as a catalyst; it increases managerial demand for AIS information, thus intensifying the use and benefits of the system and contributing more significantly to EPKM. The increase in the model's R2 (from 73.5% to 77.3%) confirms that the external context (EQ) plays a substantial role in determining the effectiveness of internal information systems, in line with the views of Pires & Alves (2022) and Nur Firdausy et al . (2022) who demonstrated the need for a more relevant and flexible AIS amidst uncertainty.

CONCLUSION AND RECOMMENDATION

The empirical research results prove that the Quality of Accounting Information Systems (AIS) Information and Human Resource Competence (HR) are two significant and positive internal determinants of the Effectiveness of Managerial Decision Making (EPKM) in MSMEs in South Sulawesi. In accordance with the first and second objectives, the availability of accurate, relevant, and timely information from the AIS directly improves the manager's ability to conduct strategic analysis at the intelligence stage of decision making. Meanwhile, HR Competence functions as a vital enabler, which ensures optimal utilization of AIS data, validates input, and interprets output into effective actions. These findings confirm that EPKM is a function of the harmonious interaction between system quality (AIS) and user quality (HR).

What is novel about this study is that Environmental Uncertainty (EA) is proven to moderate and strengthen the positive influence of AIS Information Quality on EPKM. In accordance with the third objective, this finding provides strong empirical support for Contingency Theory, which asserts that the relevance of information systems increases with high levels of external uncertainty. In a highly dynamic environment, managers' need for high-quality AIS information becomes increasingly urgent. EA acts as a catalyst that drives the intensity of use and the value of information from AIS, thereby drastically increasing its contribution to managerial decisions. The essence of this finding lies in the validation of an integrated model that shows that contextual variables (EA) must be considered; the higher the uncertainty faced by MSMEs, the greater the strategic urgency to ensure that AIS produces accurate information and that human resources are capable of managing it, making both essential resources for competitiveness in the digital era.

FUTHER STUDY

This research still has delays, so it is necessary to conduct further research related to the topic The Quality of AIS and HR Information as Determinants of Managerial Decision Effectiveness Moderated by Business Environmental Uncertainty in order to improve this research and add insight for readers.

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