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Does Technology Adoption Mediate the Determinant Factors of MSMEs' Competitive Advantage?

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ABSTRACT

This study examines the effects of human resource competence, entrepreneurial orientation, and social capital on MSMEs' competitive advantage, with technology adoption as a mediating variable. Using a quantitative survey approach, data were collected from 150 MSME actors in Kendari, Southeast Sulawesi, selected through purposive sampling. The data were analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM). Hypotheses were testes via bootstrapping, with significance determined by $t > 1.650$ and $p < 0.05$. The results indicate that human resource competence, entrepreneurial orientation, and social capital have significant positive effects on MSMEs' competitive advantage ($p > 0.05$). Technology adoption shows no direct effect on competitive advantage but significantly mediates the effect of human resource competence and entrepreneurial orientation, not social capital. These findings highlight the conditional role of technology adoption and provide empirical and practical insight for strengthening MSME competitiveness.

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1. INTRODUCTION

The company must always be prepared to face the growing industrial competitiveness as a result of globalization. Due to this requirement, the business must constantly promote innovation by incorporating different new knowledge[1]. Increasing global competition compels firms to continuously enhance innovation and organizational capabilities through the effective utilization of internal resources[2]. Human resource development is widely acknowledged as a critical driver of long-term organizational competitiveness, particularly in dynamic and technology-driven environments. For Micro, Small, and Medium-Sized Enterprises (MSMEs), strategically deploying human resources to develop competencies and adapt to market change is essential for sustaining competitive advantage[3].

From the perspective of the Resource-Based View (RBV), firm competitiveness depends on the possession and transformation of valuable, rare, inimitable, and non-substitutable resources[5]. In the MSME context, human resource competence, entrepreneurial orientation, and social capital represent strategic intangible resources, while technology adoption functions as an organizational capability that converts these resources into superior competitive outcomes[6]. However, empirical studies examining these relationships report inconsistent

findings, suggesting, unresolved theoretical tension regarding how internal resources are transformed into competitive advantage[7].

Indonesia offers a compelling empirical context for this study. MSMEs dominate the national economic structure, accounting for approximately 99.7% of all business units and absorbing more than 65% of the industrial workforce. As of 2024, more than 56 million MSMSEs operate across the country, with the majority classified as micro enterprises [8]. In Kendari, Southeast Sulawesi, MSMEs are concentrated in sectors such as culinary services, fashion, agribusiness, repair service, and creative industries, highlighting their strategic role in regional economic development. In response, the Indonesian government has prioritized MSME digital transformation through policies promoting digital onboarding, technology-based cooperatives, and increased export participation [9].

While digital technologies offer substantial opportunities to enhance MSME competitiveness, their effective utilization depends on internal organizational readiness [10], [11], [12]. Strategic human resource management is essential for developing the technical and managerial skills required to adopt and integrate digital technologies into business processes. Prior studies have identified human resource competence, entrepreneurial orientation, and social capital as key determinants of MSME competitive advantage [2], [13]. However, empirical findings remain inconsistent. Some studies report significant positive effects of human resource competence and entrepreneurial orientation on competitiveness, while others find insignificant or context-dependent relationships [14], [15], [16]. Similarly, evidence regarding the role of social capital is mixed, suggesting that its impact may depend on complementary organizational capabilities.

Technology adoption has been proposed as a mediating mechanism that links internal resources to performance outcomes [17], [18]. Although several studies confirm its mediating role between human resource competence or entrepreneurial orientation and business performance, most existing models examine these relationships in isolation and do not simultaneously incorporate multiple strategic resources [19], [20], [21]. To address this gap, this study proposes and empirically tests a structured mediation model grounded in RBV. This structure explicitly operationalizes RBV assumptions within a formal Structural Equation Modelling (SEM) framework. Partial Least Squares-SEM is employed due to its suitability for predictive-oriented analysis, complex mediation models, relatively small sample sizes, and data distributions that may deviate from multivariate normality [22], [23].

Accordingly, this study aims to examine the direct effects of human resource competence, entrepreneurial orientation, and social capital on MSMEs' competitive advantage, as well as the mediating role of technology adoption, using empirical evidence from MSMEs in Kendari, Southeast Sulawesi. By integrating RBV with a multi-construct SEM approach, this study contributes both conceptually and methodologically to the literature on MSME competitiveness and applied quantitative modelling.

2. RESEARCH METHOD

2.1 Research Design and Context

This study employed a quantitative survey-based research design to examine the relationships among human resource competence, entrepreneurial orientation, social capital, technology adoption, and MSME's competitive advantage in Kendari, Southeast Sulawesi. The research was conducted between March and May 2025. Kendari represents an analytically context due to its growing MSME sector, increasing policy emphasis on digital transformation, and structural challenges related to human resource quality and technology readiness that are characteristic of Eastern Indonesian regions. Focusing on a single city allows for contextual homogeneity while enabling a detailed examination of resource-capability interactions at the firm level; however, this design necessarily limits external validity.

2.2 Population, Sampling, and Response Rate

The target population comprised MSME owners operating in Kendari. A purposive sampling technique was applied to ensure that respondents possessed sufficient experience and relevance to the research objectives [34]. The selection criteria included MSME owners who had operated their businesses for at least two years, were actively involved in business networks, and were willing to participate in the study. Based on these criteria, 180 questionnaires were distributed, of which 150 were returned and deemed valid for analysis, resulting in a response rate of 83,3%. Respondents represented diverse MSME sectors, including culinary, fashion, technology-based businesses, cosmetics, automotive service, and agribusinesses. This sectoral differentiation was intended to capture variations in business scale, technology use, and human resource capacity across MSMEs in Kendari. As the sample was drawn from a single city using purposive sampling, the findings are context-specific and should be generalized beyond Kendari or to all Indonesian MSMEs with caution.

2.3 Instrument development and Pilot Testing

Prior to the main survey, preliminary observations and informal interviews with MSME actors and local MSME officials were conducted to identify key challenges related to competitiveness, technology use, and human resource capacity. These observations informed the refinement of questionnaire items, particularly in ensuring contextual relevance and clarity. A pilot test involving 20 MSME owners was subsequently conducted to assess

item clarity and reliability. Pilot results indicated acceptable preliminary reliability (Cronbach's alpha values exceeding 0.70 across constructs) and minor wording adjustments were made to improve clarity and contextual relevance. The final questionnaire was develop based on validated measurement scales from prior studies to ensure content validity. All indicators were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Representative items for each construct are provided in Appendix A.

2.4 Handling of Missing Data and Bias Considerations

Completed questionnaires were screened for completeness prior to analysis. Responses with substantial missing data were excluded, while minor missing values were handled using mean substitution, as the proportion of missing data was below the recommended threshold for PLS-SEM analysis. Nonetheless, mean substitution may attenuate variance and bias parameter estimates; therefore, this limitation is acknowledged, and future studies are encouraged to apply more robust techniques such as expectation-maximization or multiple implutation. Although the response rate was relatively high, nonresponse bias cannot be entirely ruled out. due to data constraints, formal diagnostic tests such as early-late respondent comparisons were not conducted. Accordingly, potential nonresponse bias is recognized as a limitation. In addition, purposive sampling may introduce selection bias by over-representing more active or networked MSME owners, which may affect external validity.

2.5 Model Specification

Data were anaylzed using Partial-Least Squares-Structural Equation Modeling (PLS-SEM) with SmartPLS software. PLS-SEM was selected due to its suitability for predictive analysis, complex mediation structures, relatively small sample sizes, and robustness to deviations from multivariate normality.

a. Measurement Model

Each latent construct was specified reflectively. The measurement model is defined as:

$$X_{ij} = \lambda_{ij}\xi_j + \varepsilon_{ij} \tag{1}$$

Where X_{ij} represents the observed indicator I of latent variable, ξ_j, λ_{ij} is the factor loading, and ε_{ij} denotes measurement error. The latent variables include human resource competence (HRC), entrepreneurial orientation (EO), social capital (SC), technology adoption (TA), and competitive advantage (CA). Measurement model evaluation followed established criteria: indicator loadings ≥ 0.70, composite reliability ≥ 0.70, average variance extracted (AVE) ≥ 0.50, heterotrait-monotrait (HTMT)≤ 0.85, and variance inflation factor (VIF) ≤ 3.3 [35]. Indicators failing to meet these thresholds were evaluated systematically, and any item removal decisions are transparently reported in the Results section.

b. Structural and Mediation Model

Based on the conceptual model and the PLS-SEM approach, the causal relationships between constructs in this study are formulated in the following structural equations:

Technology Adoption $(Z) = \beta_1 HRC + \beta_2 EO + \beta_3 SC + \zeta Z$ (2)

MSME's Competitive Advantage $(Y) = \beta_4 HRC + \beta_5 EO + \beta_6 SC + \beta_6 SC + \zeta Y$ (3)

Where:

HRC (X_1) = Human Resource Competence

EO (X_2) = Entrepreneurial Orientation

SC (X_3) = Social Capital

TA (Z) = Technology Adoption

CA (Y) = MSME's Competitive Advantage

β = path coefficients

ζ = error term (residual)

The equation confirms that Technology Adoption acts as a mediating variable in the relationship between Human Resource Competence, Entrepreneurial Orientation, and Social Capital toward MSME's Competitive Advantage.

Table 1. Research Indicators

Variable	Indicator	Scale
Human Resource Competence	1. Ability to manage business 2. Ability to carry out work 3. Education Level 4. Skills and expertise 5. Quality of work produced	Likert

	6. Work experience Hernita et al. (2021)	
Entrepreneurial Orientation	1. Autonomy 2. Innovativeness 3. Passion 4. Perseverance 5. Proactiveness 6. Risk-taking Astuti, Balqiah, and Yuliati (2024)	Likert
Social Capital	1. Business network 2. Interpersonal trust 3. Network intensity 4. Network range 5. Personal network 6. Social relations Vu, Van Binh, and Duong (2023)	Likert
Technology Adoption	1. Digital literacy rate 2. Technology accuracy 3. Technology adjusting 4. Technology familiarity 5. Technology frequency 6. Technology skills Cahyadi et al. (2024)	Likert
MSMEs Competitive Advantage	1. Being part of a professional team 2. Capacity to reduce production costs 3. Having a wider market development 4. Product marketing innovation 5. Product or service differentiation 6. Product updates in accordance with market trends Lee, Wu, and Jong (2022)	Likert

3. RESULT AND ANALYSIS

After the questionnaires were distributed, there are 150 valid survey responses were received.

Table 2. Respondents Description

10	Criteria	Frequency	Percentage
Gender	Male	53	35.3%
	Female	97	64.7%
Age	21-26 years old	13	8.7%
	27-32 years old	22	14.7%
	33-38 years old	29	19.3%
	39-45 years old	46	30.7%
	>46 years old	40	26.6%
Education	Senior High School	61	40.7%
	Diploma	38	25.3%
	Bachelor Degree	31	20.7%
	Master Degree	20	13.3%
Business Sector	Culinary	77	51.3%
	Fashion	37	24.7%
	Agribusinesses	19	12.7%
	Other	17	11.3%
Business Duration	< 3 years	34	22.7%
	3-7 year	67	44.6%
	7 > years	49	32.7%

Source: Data processing (2025)

Table 2 shows that there are more female respondents than male, with 64.7% of the total respondents being female. Respondents aged 39 to 45 years old are more dominant, which is 30.7% of the total respondents. Regarding educational background, most MSME actors have a senior high school education, which is 40.7%. Most of the businesses owned by both female and male entrepreneurs were in the culinary sector, which is 51.3%. On the other hand, the length of business dominance was between 3-7 years.

3.1 Measurement Model Evaluation (Outer Model)

The measurement model was evaluated to assess reliability and validity. Convergent validity was examined using indicator loadings and Average Variance Extracted (AVE). indicators with outer loadings below the recommended threshold of 0.70 were carefully reviewed. In line with PLS-SEM guidelines, indicators with loadings between 0.60 and 0.70 were retained when their removal did not increase composite reliability or AVE substantially, ensuring content validity of the constructs. All constructs achieved AVE values greater than 0.50, indicating adequate convergent validity.

Internal consistency reliability was assessed using composite reliability and Cronbach's alpha. All constructs exceeded the recommended threshold of 0.70, confirming that the measurement instruments were reliable. Discriminant validity was assessed using both the Formell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. The square root of the AVE for each construct was greater that its correlations with other constructs, satisfying the Fornell-Larcker criterion. In addition, all HTMT values were below the conservative threshold of 0.85, indicating that each construct was empirically distinct from the others. Given that all data were collected from a single survey source, potential common method bias (CMB) was assessed. A full collinearity test was conducted by examining variance inflation factor (VIF) values for all constructs. The VIF values were below the recommended threshold of 3.3, suggesting that common method bias was unlikely to be a serious concern in this study.

Human Resource Competence (HRC), Entrepreneurial Orientation (EO), Social Capital (SC), Technology Adoption (TA), and MSME's Competitive Advantage (CA) were assessed in the measurement model. Table 3 presents the factor loadings, reliability, and validity results for these constructs.

Table 3. Factor Loadings, Cronbach's Alpha, Composite Reliability and AVE

Variable	Indicator	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Human Resource Competence (X_1)	HRC.1	0.754	0.832	0.840	0.723
	HRC.2	0.884			
	HRC.3	0.909			
	HRC.4	0.871			
	HRC.5	0.842			
	HRC.6	0.832			
Entrepreneurial Orientation (X_2)	EO.1	0.721	0.810	0.831	0.692
	EO.2	0.779			
	EO.3	0.883			
	EO.4	0.899			
	EO.5	0.849			
	EO.6	0.846			
Social Capital (X_3)	SC.1	0.830	0.771	0.794	0.585
	SC.2	0.714			
	SC.3	0.697			
	SC.4	0.729			
	SC.5	0.814			
	SC.6	0.796			
Technology Adoption (Z)	TA.1	0.820	0.779	0.808	0.623
	TA.2	0.805			
	TA.3	0.798			
	TA.4	0.749			
	TA.5	0.760			
	TA.6	0.802			
MSMEs' Competitive Advantage (Y)	MSMEs CA.1	0.888	0.783	0.811	0.632
	MSMEs CA.2	0.801			
	MSMEs CA.3	0.760			
	MSMEs CA.4	0.805			
	MSMEs CA.5	0.745			
	MSMEs CA.6	0.762			

Source: Data Processing (2025)

Based on table 3, each indicator's factor loading value is more than 0.60, indicating the indicators reliability in assessing MSMEs competitive advantage. Although a threshold of 0.70 is often recommended, loadings above 0.60 are considered acceptable in exploratory and predicative research, particularly when theoretical relevance is maintained. Both the Cronbach's alpha and composite reliability values, which are both higher than 0.700, show the level of reliability. Value above 0.70 reflect satisfactory internal consistency, while values exceeding 0.80 suggest good reliability of the measurement model. It was found that each variable was reliable and that each

indicator's construct reliability differed. Additionally, because all of these indicators, all of them satisfy the criteria for strong convergence, as indicated by AVE values more than 0.500, which show the degree of convergence. AVE values greater than 0.50 indicate that more than half of the variance of indicators is accounted by the latent construct. Thereby confirming adequate convergent validity.

3.2 R- Square

The degree to which an independent variable can influence dependent variables is expressed using the R-squared metric. It ranges from 0 to 1, where higher values indicate a greater explanatory power. Standard R^2 has a mathematical tendency to increase whenever a new predictor is added to the model, even if that predictor is irrelevant. To provide a more conservative and unbiased estimate, researchers report the Adjusted R^2.

$$R^2 = \frac{\text{Variance Explained by Model}}{\text{Total Variance od Dependent Variabel}} \quad (4)$$

Table 4. R-Square

	R-Square (R^2)	R-Square Adjusted
MSMEs Competitive Advantage (Y)	0.570	0.543
Technology Adoption (Z)	0.413	0.395

Source: Data processing (2025)

The explanatory power of the structural model was assessed using the coefficient of determination (R^2). As shown in Table 4, the R^2 value for MSMEs' Competitive Advantage (Y) is 0.570, indicating that human resource competence, entrepreneurial orientation, social capital, and technology adoption collectively explain 57.0% of the variance in MSMEs' Competitive Advantage. The remaining 43.0% is attributed to other factors not included in the model. Table 4 also shows that the R^2 value for Technology Adoption (Z) is 0.413, suggesting that human resource competence, entrepreneurial orientation, and social capital account for 41.3% of the variance in technology adoption. The remaining 58.7% is explained by other variables outside the scope of this study. Overall, these results indicate that the structural model demonstrates moderate explanatory power.

3.3 Path Coefficients

Within the PLS-Sem framework, the mediation effect is tested through the indirect effect, which is calculated as the product of the path coefficients:

Indirect Effect $_{X\to Y} = \beta_{X\to Y} \times \beta_{z\to Y}$ (5)

Thus:

Indirect Effect of HRC → TA → CA

Indirect Influence of EO → TA → CA

Indirect Influence of SC → TA → CA

Evaluated using a bootstrapping procedure. The bootstrapping results show that this mediation path is statistically significant (t-statistic > 1.96; p< 0.05), indicating that Technology Adoption plays a significant role as a mediator in enhancing the competitive advantage of MSMEs.

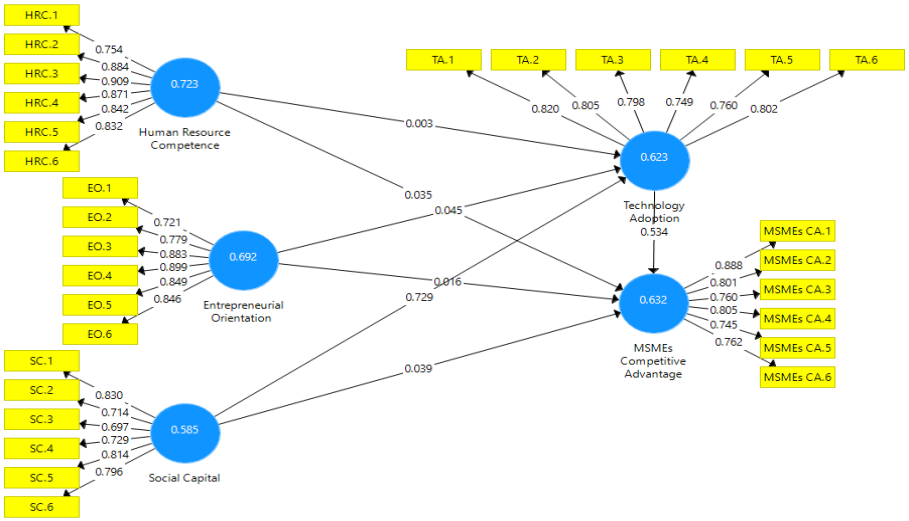

Figure 1. Path analysis results

Source: Data processing (2025)

Table. 5 Hypothesis Test Results

Statement	Original Sample (O)	Sample Mean(M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
HR Competence → MSMEs Competitive Advantage	0.366	0.358	0.153	2.388	0.035
Entrepreneurial Orientation → MSMEs Competitive Advantage	0.376	0.386	0.127	3.369	0.016
Social Capital → MSMEs Competitive Advantage	0.267	0.267	0.109	2.114	0.039
Technology Adoption → MSMEs Competitive Advantage	0.102	0.108	0.082	1.243	0.534
HR Competence → Technology Adoption → MSMEs Competitive Advantage	0.673	0.672	0.101	5.625	0.003
Entrepreneurial Orientation → Technology Adoption → MSMEs Competitive Advantage	0.210	0.218	0.123	2.039	0.045
Social Capital → Technology Adoption → MSMEs Competitive Advantage	0.153	0.143	0.129	1.192	0.729

Source: Data processing (2025)

As shown in Table 5, the hypothesis testing results indicate that human resource competence has a significant positive effect on MSME's competitive advantage (t-statistic = 2.388 > 1.65; p-value = 0.035 < 0.05); therefore, H1 is accepted. Entrepreneurial orientation also has a significant positive effect on MSME's competitive advantage (t-statistic = 3.369 > 1.65; p-value = 0.016 < 0.05), supporting H2. Similarly, social capital significantly affects MSMEs' competitive advantage (t-statistic = 2.114 > 1.65; p-value = 0.039 < 0.05); thus, H3 is accepted. In contrast, technology adoption does not have a significant direct effect on MSMEs' competitive advantage (t-statistic = 1.243 > 1.65; p-value = 0.534 > 0.05); therefore, H4 is rejected. Regarding the mediating effects, technology adoption significantly mediates the relationship between human resource competence and MSMEs' competitive advantage (t-statistic = 5.625 > 1.65; p-value = 0.003 < 0.05), supporting H5. Technology adoption also significantly mediates the relationship between entrepreneurial orientation and MSMEs' competitive advantage (t-statistic = 2.039 > 1.65; p-value = 0.045 < 0.05); thus, H6 is acceptes. However, technology adoption does not mediate the relationship between social capital and MSMEs' competitive advantage (t-statistic = 1.192 > 1.65; p-value = 0.729 > 0.05), leading to the rejection of H7.

3.4 Discussion

The Effect of Human Resource Competence on MSMEs Competitive Advantage

Based on the results of data analysis, human resource competence has a significant positive effect on MSMEs competitive advantage in Kendari with t-statistic 2.388 > 1.65 and p-value 0.035 < 0.05. This result suggests that within the local MSME context, productivity and profitability are closely linked to the quality of human resource, encompassing both hard skills (technical and operational abilities) and soft skills (problem-solving, adaptability, and communication). From a conceptual mathematical perspective, this relationship can be expressed as:

$$CA = \alpha + \beta_1 HRC + \varepsilon \tag{6}$$

Where CA represents competitive advantage, HRC denotes Human Resource Competence, $\beta_1 > 0$ indicates a positive marginal effect of HR competence on competitive advantage, and ε captures unexplained variation. The significant empirical coefficient confirms that improvements in HR competence yield incremental gains in competitive advantage. Consistent with the Resource-Based View (RBV), human resource competence represents a strategic internal asset that is valuable, difficult to imitate, and capable of generating sustained competitive advantage. From an analytic perspective, human resource competence is not only a source of efficiency but also of strategic flexibility. Competent employees facilitate process innovation, quality improvement, and customer opportunities in the sector. In Kendari, MSMEs often rely on experiental learning and non-formal training rather than formal education, making practical competence particularly relevant. This finding aligns with prior empirical evidence (Pratama, Moeljadi, and Rofiq, 2022; Lee, Wu, and Jong, 2022), and confirms that strengthening human capital remains a critical foundation for competitiveness, especially in localized MSME ecosystems.

The Effect of Entrepreneurial Orientation on MSMEs Competitive Advantage

Based on the research findings, entrepreneurial orientation has a significant positive effect on MSMEs competitiveness in Kendari with t-statistic 3.369 > 1.65, and p-value 0.016 < 0.05. This indicates that

innovativeness, proactiveness, and risk-taking behaviors enable MSME owners to better respond to market dynamics and customer needs. The relationship can be conceptually modeled as:

$$CA = \alpha + \beta_2 HRC + \varepsilon \tag{7}$$

Where EO denotes entrepreneurial orientation and $\beta_2 > 0$ reflects its positive contribution to competitive advantage. A higher level of EO increases the probability that MSMEs will exploit market opportunities and differentiate their offerings. This was consistent with the Resource-Based View (RBV) theory, entrepreneurial orientation encourages MSMEs to be innovative in developing products, services and business strategies. Entrepreneurial orientation as part of the principle of business management is a characteristic of crafters so that they have and encourage the intention to continue to seek and take advantage of every opportunity that exists proactively, innovatively, and also courageously in taking business risks. Competitive advantage reflects the results of strategy implementation that utilizes various resources owned by the company. In the local context, MSMEs that actively seek oportunities and adapt their strategies tend to be more resilient and competitive. This finding supports eralier studies. This study's findings are consistent with a number of earlier empirical studies, including those conducted by Campos-Núñez and Serrano-Malebrán (2024); Kusa, Suder, and Duda (2024); Kiyabo and Isaga (2020) and reinforces the view that entrepreneurial orientation is a key driver of competitive advantage, particularly when markets are characterized by rapid change and uncertainty.

The Effect of Social Capital on MSMEs Competitive Advantage

Based on the results of data analysis, social capital has a significant positive effect on MSMEs competitive advantage in Kendari with t-statistic 2.114 > 1.65, and p-value 0.039 < 0.05. This indicates that MSMEs in Kendari is well connected with its business partners, and MSMEs has utilized the necessary resources and capabilities through its business network. Furthermore, MSMEs in Kendari has received high trust and commitment from its business partners. MSMEs have gained and increased value- added knowledge from their business networks. MSMEs social networks could influence their strategies, decisions, processes, and activities so that MSMEs in Kendari could improve their performance. Mathematically, this effect can be illustrated as:

$$CA = \alpha + \beta_3 HRC + \varepsilon \tag{8}$$

Where SC represents social capital and $\beta_3 > 0$ indicates that stronger networks and trust increase competitive advantage. Social capital yielded an effect on MSMEs performance in accordance with the RBV theory, proposing that social capital includes trust, and also external networks, which, if managed well by MSMEs actor, will create a competitive advantage. Social interactions, network ties, and also the quality of existing relationships from external MSMEs networks in Kendari with business partners, such as ministries, financial institutions, communities, and village governments, have been well connected. This connection of good social capital could create a competitive advantage, increasing the performance of MSMEs. In other words, the higher the social capital owned by MSMEs, the higher the MSMEs performance will be. The results of this study align with previous research by Widiastuti, Pratama, and Utami (2024); Widyawati, Soemaryani, and Muizu (2023), which exhibited that social capital influenced the performance of MSMEs. This ascertains that the social network between MSMEs and external parties is well connected, thus creating a competitive advantage for the effectiveness of their performance.

The Effect of Technology Adoption on MSMEs Competitive Advantage

Contrary to expectations, technology adoption does not have a significant direct effect on MSMEs' competitive advantage in Kendari with t-statistic 1.243 > 1.65, and p-value = 0.534 > 0.05. This result suggests that digitalization requires a high investment value and low government support and regulation. Conceptually, this non-significant relationship can be expressed as:

$$CA = \alpha + \beta_4 TA + \varepsilon,\ \beta_4 \approx 0 \tag{9}$$

Where TA denotes technology adoption. This insignificant coefficient implies that without complementary capabilities, technology investment does not translate into competitive advantage. Accordance with the Resource-Based View (RBV) theory, dynamic capability emphasizes that in order to maintain this competitive edge in the market, constant innovation, and also adaptability is required. This might not occur because, in general, technological investment needs a significant amount of capital, particularly for MSMEs in Kendari. Long-term advantages will be gained, though, such as the ability to more easily evaluate the costs of purchasing raw materials for their products and other supporting supplies online. As a result, they can obtain the best deals on goods that meet their business demands at the most reasonable pricing. Although there is no denying that digitalization necessitates large infrastructure investment, the company will eventually be better equipped to raise earnings in addition to the efficiency and effectiveness generates. Additionally, a large amount of funding was required at the

start of its implementation. The findings of this research are consistent with the study by Mutoharoh, Winarsih, and Buyong (2020); Ketut, Nyoman, and Wayan (2024), digital transformation did not affect on MSMEs competitive. SMEs in Kendari rely on self-assessment and pre-existing knowledge, regardless of educational qualifications, to navigate technology adoption effectively.

The Effect of Human Resource Competence on MSMEs Competitive Advantage Mediated by Technology Adoption

The study's findings demonstrated that technology adoption can mediate the effect of human resource competence on MSMEs competitive advantage in Kendari with t-statistic 5.625 > 1.65, and p-value 0.003 < 0.05). The greater the level of HR digitalization, the more likely it is that HR will actively support other business units in their digital transformation efforts. Digitalization is considered one of the key factors contributing to the success of SMEs and one of the major advantages of digital transformation. HR competence plays a major role in the success of SMEs digitalization efforts, which can be difficult for SMEs. SMEs that use technology are better able to improve operational efficiency and meet market needs in fiercely competitive conditions. This flexibility results in better performance outcomes, suggesting that MSMEs competitive position can be considerably strengthened by adopting technology. This mediation mechanism can be expressed through a two-equation system:

$$TA = \alpha_1 + \gamma_1 HRC + \varepsilon_1 \tag{10}$$

$$CA = \alpha_1 + \beta_5 TA + \varepsilon_2 \tag{11}$$

The significant indirect effect $(\gamma_1\beta_5)$indicates that HR competence enhances technology adoption, which is turn strengthens competitive advantage. In Kendari, adoption of technology serves as a buffer, allowing SMEs to continue operating at high levels even in highly competitive environments. Technology advances are more likely to be used by SMEs with greater technological capabilities to boost performance in cutthroat markets. SMEs that prioritize technology adoption have a higher chance of achieving notable performance improvements in a competitive setting than those who do not. This is in accordance with research by Desmiyawati et al. (2023); Siagian and Ningrum (2022) stated that digitalization is able to significantly mediate the effect of HR competence on MSMEs competitive advantage. Given the potential opportunities in the market, MSMEs should develop HR professionals who are adept at navigating the adoption of new technologies.

The Effect of Entrepreneurial Orientation on MSMEs Competitive Advantage Mediated by Technology Adoption

The outcomes of this study found that technology adoption is able to strengthen and mediate the effect of entrepreneurial orientation on MSMEs competitive advantage in Kendari with t-statistic 2.039 > 1.65, and p-value 0.045 < 0.05. This indicates that the relationship between entrepreneurial orientation and competetive advantage become more significant when MSMEs exhibit higher levels of technology adoption. MSMEs with high level of technology adoption are better able to leverage their entrepreneurial characteristics to gain a competetive adge. Entrepreneurial orientation alone is not sufficient to enhance competitiveness unless supported by effective use of technology. Within the Kendari context, MSMEs are better able to translate their entrepreneurial traits, such as innovativeness, proactiveness, and risk-taking into tangible competitive advantages by adopting relevant digital tools and technological innovations. This relationship can be modeled as:

$$TA = \alpha_1 + \gamma_2 HRC + \varepsilon_1 \tag{12}$$

$$CA = \alpha_2 + \beta_6 TA + \varepsilon_2 \tag{13}$$

The significant indirect path suggests that entrepreneurial orientation translates into competitive advantage primarily when supported by effective technology adoption. Thus, technology adoption serves as a strategic amplifier that amplifies the impact of entrepreneurial behavior on business performance in the local context. This is in accordance with the study by Campos-Núñez and Serrano-Malebrán (2024); Yudistira and Wahjudi (2025) revealed a significant effect of entrepreneurial orientation on business performance when mediated by technology adoption. These findings highlight the strategic importance of digital capability in leveraging entrepreneurial traits within the local context of Kendari.

The Effect of Social Capital on MSMEs Competitive Advantage Mediated by Technology Adoption

The study results demonstrated that technology adoption cannot mediate the effect of social capital on MSMEs competitive advantage in Kendari with t-statistic 1.192 > 1.65, and p-value 0.729 > 0.05. Formally this can be expressed as:

$$TA = \alpha_1 + \gamma_2 SC + \varepsilon_1,\ \gamma_3 \approx 0 \tag{14}$$

This means that even if SMEs have strong social capital, adopting technology doesn't help translate that into competitive advantage in that context. Digital use appears to create group exclusivity since not all users can take advantage of the opportunities due to service restrictions based on factors like age, gender, and so on. MSME entrepreneurs face the same business problems, there is great potential for learning to improve knowledge and skills to a technology adoption. MSME owners must be oriented towards winning competitions by utilizing digital technology to empower themselves and investing in developing human and technical capacities. It is hoped that this step will help MSME owners to be in a position of maximum performance. Even if MSMEs in Kendari have strong social network, if they don't have the skills, infrastructure, or resource to adopt technology effectively, then social capital won't translate into tech use, as lack of internet access, high cost of digital tools, and lack of skill. MSMEs in Kendari has its specific socio-cultural, geographic, and social environment, perhaps there is resistence to technology, risk-averse, or traditional business models that do not make use of technology even when available. This is in accordance with the study by Prabandari, Yulianti, and Risanto (2023), digitalization is unable to significantly mediate the effects of social capital on MSME competitiveness.

4. CONCLUSION

This study aimed to examine the effects of human resource competence, entrepreneurial orientation, social capital, and technology adoption on the competitive advantage of MSMEs in Kendari, Southeast Sulawesi, and to assess the mediating role of technology adoption. Based on the data analysis and discussion, the study findings demonstrate that human resource competence, entrepreneurial orientation, and also social capital significantly and positively affect MSMEs competitive advantage in Kendari, Southeast Sulawesi. MSMEs with more competent human resource, a strong entrepreneur mindset, and robust social network are better positioned to differentiate themselves in the market, respond to chellenges, and also sustain business growth.

In contrast, technology adoption alone does not directly enhance MSMEs' competitiveness, suggesting that digital tools without sufficient alignment with business strategy, infrastructure, and digital skills are insufficient to improve competitive performance. However, technology adoption plays an important mediating role by strengthening the effects of human resource competence and entrepreneurial orientation on competitive advantage, while it does not mediate the effect of social capital. These findings highlight the strategic importance of integrating digital capabilities with human and organizational resources to maximize performance and resilience in increasingly digitalized business environments.

From a practical and policy perspective, the study highlights the need for more targeted and integrated interventions to improve MSMEs' economic performance. Policymakers, particularly across government departments, are encouraged to design micro-entrepreneurial training programs that emphasize entrepreneurial competencies, strategic approaches to competitive advantage, and improved access to working capital. For MSME owners, the findings suggest that clearly demonstrating managerial competence and strategic orientation to stakeholders is critical for strengthening market position. For investors and government agencies, the results imply that assessments of MSMEs should go beyond financial indicators to include competence, strategy, and digital readiness.

However, there are still limitations to this research since the sample of managed MSMEs only comes from one regency, so it did not distinguish between generations of MSMEs owners. Further research is expected to expand the sampling area, differentiate samples based on generational groups and add variables to determine competitive advantage. Future studies could extend the present model by incorporating additional innovation capability, access to finance, human capital quality, and regulatory support. Finally, the researcher advises future authors to use different testing technique methods, develop other factors or variables, and employ larger-scale study items to get a more comprehensive understanding and extrapolate more general findings. For future research, is expected to enrich the theoretical framework by viewing from a different theory, choosing different but similar research objects to enable describing the condition of other objects and serving as comparison and increasing the scope to a wider range of generalization. The research future is expected to be done longitudinally or in the long term of time and continuously so that the research result will be in accordance with the ongoing changes occurring to the object or the subject of the research.

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