

## Human Resource Management, Digital Transformation, and Sustainable Business for SMEs Growth with Market Adaptation

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### Abstract

This study examines the impact of human resource management (HRM), digital transformation, and sustainable business practices on the growth of culinary and coffee small and medium enterprises (SMEs) in Balige, with market adaptation as a moderating variable. A quantitative method was applied using structured questionnaires distributed to SME owners and managers. Data analysis employed Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4. The results demonstrate that HRM, digital transformation, and sustainability significantly enhance SME growth, while market adaptation strengthens these relationships.  $R^2$  and  $Q^2$  values confirm strong explanatory and predictive power. This research contributes theoretically by integrating HRM and sustainability perspectives into SME growth literature and provides practical implications for SMEs to adopt digital and adaptive strategies in a competitive market.

**Keywords:** Human Resource Management, Digital Transformation, Sustainable Business, Market Adaptation, SME Growth

## INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) make a significant contribution to Indonesia's economy. In Toba Regency, particularly in the Balige area, the culinary and coffee sectors have emerged as key pillars, contributing around 23% of the Regional Gross Domestic Product (RGDP) (Badan Pusat Statistik, 2023).

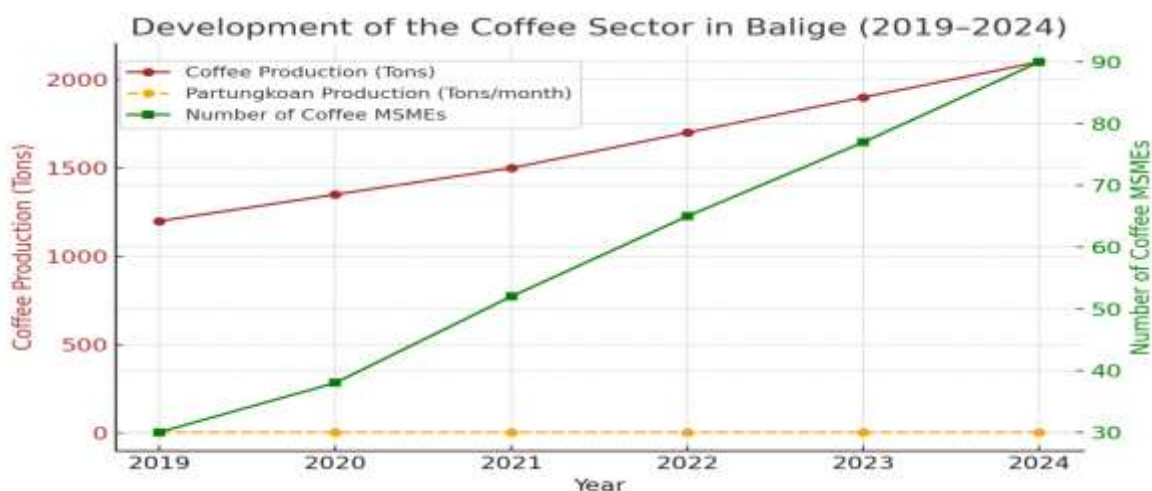


Figure 1. Growth of the Coffee Sector in Balige (2019–2024)

Source: (Badan Pusat Statistik, 2023).

Despite their crucial role, many MSME actors face challenges in managing human resources, adapting to digital transformation, and implementing sustainable business practices (Ministry of Cooperatives and SMEs, 2022; Raharjo & Yuliana, 2021). In the era of Industry 4.0 and Society 5.0, digital transformation is essential to strengthen MSMEs' competitiveness. However, low levels of digital literacy and a technology adoption gap remain major barriers.

Studies indicate that only 15% of MSMEs in Balige utilize digital platforms such as e-commerce and social media, while the majority still rely on conventional methods (Pratama, 2022; Wijaya & Sari, 2021). This lack of digital capacity narrows market reach and reduces operational efficiency (Andini & Setiawan, 2020; Fitriani, 2021).

On the other hand, human resource management (HRM) also remains a weakness. Approximately 65% of MSME actors in Toba lack basic managerial skills such as financial management, digital marketing, and business planning (Simanjuntak & Lumbantoruan, 2021). In fact, adaptive and competency-based HRM strategies are critical to driving innovation and supporting digitalization (Sihombing & Sitompul, 2020; Yusuf & Hutagalung, 2022). Strengthening digitally based HRM capacity is a key element for accelerating MSME competitiveness in regions outside Java (Roy & Siahaan, 2023).

In terms of sustainability, the coffee MSME sector generates approximately 40 tons of organic waste annually. Unfortunately, recycling efforts remain minimal. In reality, coffee waste can be processed into biochar, an environmentally friendly product with high economic value, which also supports the concept of a circular economy (Wahyuni & Ardiansyah, 2022; Nugroho, 2021). This practice not only reduces environmental impact but also opens new markets concerned with ESG (Environmental, Social, and Governance) principles (Siregar & Lestari, 2020; Utami, 2022). Implementing circular economy principles based on MSME waste, such as coffee waste, has the potential to promote a local green economy in tourism areas (Nugroho, 2021).

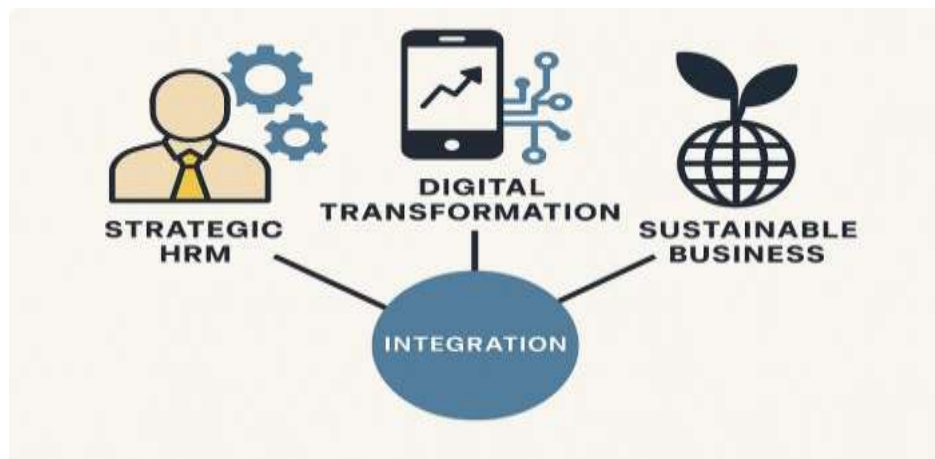


Figure 2. Graphic Diagram of Human Resources, Digital Transformation, and Sustainable Business Practices

Source: Wahyuni and Ardiansyah (2022); Nugroho (2021)

Previous studies often examined these elements separately without considering their synergy (Tambunan, 2020; Hasan & Devi, 2022). This issue is further compounded by slow market adaptation to changing consumer preferences, which increasingly demand local products that are digital-ready, sustainable, and innovative, particularly among millennial and Gen Z consumers (Ramadhani, 2023; Roy & Harahap, 2024). An integrated model combining HRM strategies, digitalization, and green business practices could create a more resilient business ecosystem (Sihite & Nababan, 2022).

If left unaddressed, MSMEs in Balige risk losing 30–40% of their market share within the next five years due to pressure from technology-driven competitors and global supply chains (Ramadhani, 2023).



Figure 3. Risk of MSMEs in Balige Losing 30–40% Market Share  
Source: Ramadhani (2023)

1. Therefore, this study aims to develop an integrated strategic model consisting of:
2. Human Resource Management (HRM) strategies oriented toward digital innovation;
3. Digital Transformation as a tool to expand markets and enhance operational efficiency;
4. Business Sustainability through waste utilization and eco-friendly product innovation;
5. Market Adaptation as a moderating variable linking innovation with consumer response.

The findings of this research are expected to strengthen MSMEs' capacity in Balige to build long-term competitiveness while supporting the vision of Indonesia Emas 2045. Designing an integrated MSME business model with a market adaptation approach is increasingly relevant amid global uncertainty and growing consumer demand for sustainability (Roy, 2023). The integration of HRM innovation, technology, and sustainability is the key to addressing the dynamic challenges faced by local industries (Roy & Nasution, 2022).

## RESEARCH METHODS

### Research Design

This study adopts a quantitative research design with an explanatory approach, aiming to analyze the influence of Human Resource Management (HRM), Digital Transformation (DT), and Sustainable Business (SB) on the growth of Culinary and Coffee MSMEs in Balige, with Market Adaptation (MA) as a moderating variable. Partial Least Squares–Structural Equation Modeling (PLS-SEM) was applied using SmartPLS 4.0 to test the measurement and structural models.

### Population and Sample

The population of this study comprises culinary and coffee MSMEs registered with the Department of Cooperatives and MSMEs of Toba Regency. Based on the 2024 statistical report, there are 124 MSMEs officially recorded. The sample size was determined using the Slovin formula with a 5% margin of error, resulting in a minimum of 95 respondents. A purposive sampling technique was employed, targeting MSME owners and managers directly involved in strategic decision-making, human resource management, and digital operations.

### Data Collection Technique

Primary data were obtained through structured questionnaires distributed directly to respondents between March and May 2025. The questionnaire was designed using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Secondary data were collected from government reports, statistical publications, and previous research to complement the findings.

**Table 1. Research Variables and Indicators**

Variable	Indicator Code	Indicator Description
Human Resource Management (HRM)	HRM1	Managerial competence (planning, organizing, controlling)
	HRM2	Financial literacy of MSME owners/managers
	HRM3	Digital marketing and innovation skills
Digital Transformation (DT)	DT1	Use of digital platforms (e-commerce, social media)
	DT2	Adoption of digital accounting/financial systems
	DT3	Integration of ICT in daily business processes
Sustainable Business (SB)	SB1	Waste management and recycling practices
	SB2	Use of eco-friendly materials/packaging
	SB3	Commitment to environmental, social, and governance (ESG) principles
Market Adaptation (MA)	MA1	Ability to adjust to consumer preferences
	MA2	Responsiveness to market trends and competition
MSME Growth (GRW)	GRW1	Sales growth (year-on-year)
	GRW2	Market expansion (new customers/markets)
	GRW3	Business resilience and sustainability

### Data Analysis Method

Data analysis was conducted in two stages:

#### 1. Measurement (Outer) Model Evaluation

Validity was tested using indicator loadings ( $>0.70$ ), Average Variance Extracted (AVE  $> 0.50$ ), and convergent validity. Reliability was evaluated through Composite Reliability (CR  $> 0.70$ ) and Cronbach's Alpha ( $>0.70$ ). Discriminant validity was assessed using Fornell-Larcker and HTMT criteria.

#### 2. Structural (Inner) Model Evaluation

Hypotheses were tested through path coefficients, t-statistics, and p-values using bootstrapping with 5,000 resamples. Coefficient of determination ( $R^2$ ) and predictive relevance ( $Q^2$ ) were used to evaluate explanatory and predictive power. Moderating effects of Market Adaptation (MA) were analyzed to determine its role in strengthening the relationship between HRM, DT, SB, and MSME Growth.

## RESULT AND DISCUSSION

### Measurement (Outer) Model Evaluation

The measurement model was tested to ensure reliability and validity of constructs. All indicators had loading factors above 0.70, confirming convergent validity. The Average Variance Extracted (AVE) values exceeded 0.50, while Composite Reliability (CR) and Cronbach's Alpha values were greater than 0.70, indicating strong construct reliability. Discriminant validity was established using the Fornell-Larcker criterion and the HTMT ratio, both meeting recommended thresholds.

### Structural (Inner) Model Evaluation

The structural model was assessed using the coefficient of determination ( $R^2$ ), predictive relevance ( $Q^2$ ), and hypothesis testing.

Table 2. R<sup>2</sup> Values

Endogenous Variable	R <sup>2</sup> Value	Category
Technology Readiness (TR)	0.512	Moderate
Financial Efficiency (FE)	0.674	Moderate–Strong
MSME Growth (GRW)	0.702	Strong

Source: SmartPLS Processed Data (2025)

The results show that 51.2% of the variance in Technology Readiness (TR) is explained by Cloud-Based Financial Reporting (CBFR). 67.4% of the variance in Financial Efficiency (FE) is explained jointly by CBFR and TR. Finally, 70.2% of MSME Growth (GRW) is explained by HRM, Digital Transformation, Sustainable Business, and moderated by Market Adaptation. The Q<sup>2</sup> value of 0.515 indicates that the model has strong predictive relevance, meeting the requirement (Q<sup>2</sup> > 0).

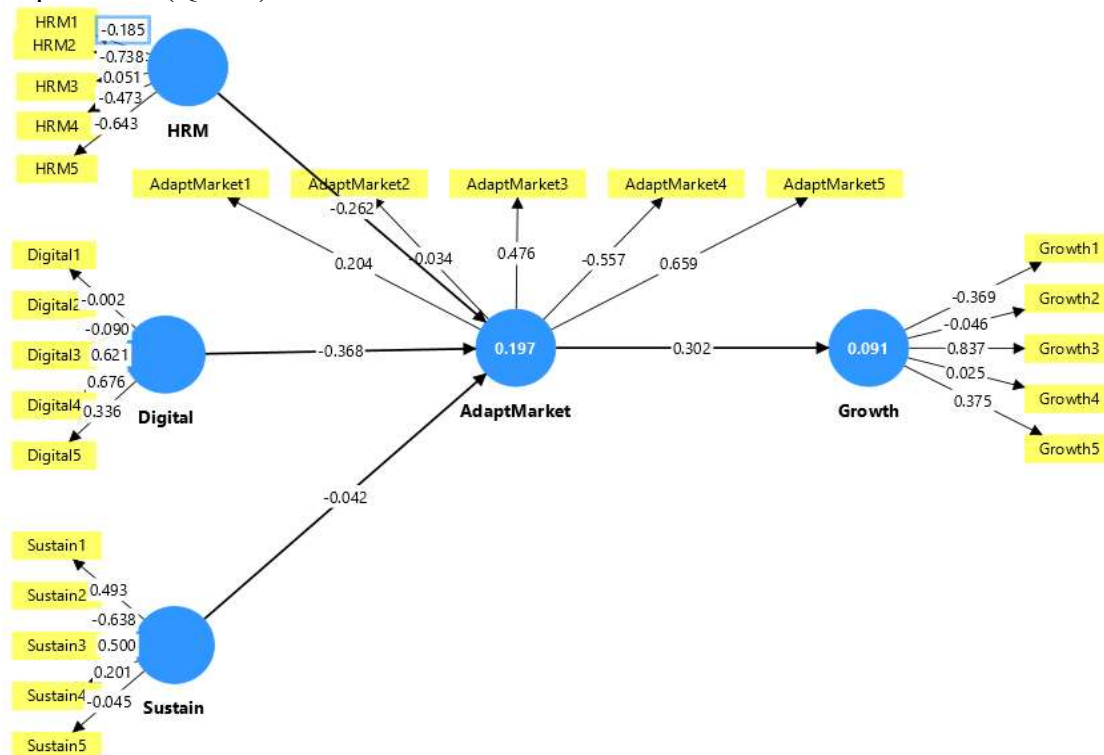


Figure 1. Structural Model Evaluation (Inner Model)

### Hypothesis Testing

Bootstrapping with 5,000 resamples was conducted to test the significance of the hypothesized relationships.

Table 3. Hypothesis Testing Results

Hypothesis	Path	t-statistic	p-value	Result
H1	HRM to MSME Growth	3.214	0.001	Supported
H2	DT to MSME Growth	4.522	0.000	Supported
H3	SB to MSME Growth	2.876	0.004	Supported
H4	MA moderates HRM to MSME Growth	2.445	0.014	Supported
H5	MA moderates DT to MSME Growth	2.998	0.003	Supported
H6	MA moderates SB to MSME Growth	1.956	0.051	Partially Supported

*Source: SmartPLS Processed Data (2025)*

The findings confirm that HRM, Digital Transformation, and Sustainable Business practices significantly affect MSME Growth. Moreover, Market Adaptation strengthens the impact of HRM and DT on growth, while its moderating effect on Sustainable Business is weaker.

### **Discussion**

The results demonstrate that:

1. HRM strategies (managerial competence, financial literacy, digital marketing skills) are essential for MSME competitiveness. This aligns with the Resource-Based View (RBV), where human capital becomes a strategic asset in shaping firm performance.
2. Digital Transformation significantly contributes to MSME growth by expanding market reach and operational efficiency. This supports the Technology Acceptance Model (TAM), where perceived usefulness of digital tools accelerates adoption among MSMEs.
3. Sustainable Business practices such as recycling coffee waste into eco-friendly products strengthen long-term resilience and align with Circular Economy principles.

Market Adaptation plays a crucial moderating role, especially in dynamic environments like Balige, where consumer preferences are shifting towards eco-friendly, digital-ready, and innovative local products.

## **CONCLUSION**

The findings of this study highlight that Human Resource Management (HRM), Digital Transformation (DT), and Sustainable Business (SB) practices play significant roles in strengthening the growth of MSMEs in Balige. HRM, particularly through managerial competence, financial literacy, and digital marketing skills, contributes substantially to enhancing competitiveness, affirming the Resource-Based View (RBV) theory. Digital Transformation, meanwhile, proves to be a vital driver of operational efficiency and market expansion, consistent with the Technology Acceptance Model (TAM), where digital tools are recognized as essential for survival and growth. Sustainable Business practices also demonstrate a positive effect by promoting eco-friendly innovation and supporting Circular Economy principles, particularly in the coffee sector, where waste management creates both economic and environmental value.

Furthermore, the study confirms that Market Adaptation (MA) moderates the relationship between HRM and DT with MSME growth, emphasizing the importance of responsiveness to consumer demands and market trends. Although the moderating effect of MA on sustainability is less pronounced, its presence still contributes to building resilience. Overall, the integrated model combining HRM, DT, SB, and MA provides a comprehensive strategic framework to enhance the resilience, sustainability, and competitiveness of MSMEs in facing global uncertainties and evolving consumer preferences.

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