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# The Effect of Digital Marketing Strategy and Technology-Based Human Resource Development on Online Business Competitiveness with Digital Innovation as a Mediating Variable Among Generation Z Entrepreneurs in Bogor City

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## Abstract:

This study aims to analyze the effect of digital marketing strategy and technology-based human resource development on online business competitiveness with digital innovation as a mediating variable among Generation Z entrepreneurs in Bogor City, Indonesia.

This research employs a quantitative method with a causal approach. The sample consists of 170 Generation Z entrepreneurs who actively operate online businesses in Bogor City, selected through purposive sampling. Data were collected using a 5-point Likert scale questionnaire distributed via Google Form and analyzed using Structural Equation Modeling-Partial Least Square (SEM-PLS) with SmartPLS 4 software.

The results indicate that both digital marketing strategy and technology-based HR development have a positive and significant effect on online business competitiveness. Digital innovation successfully mediates the relationship between both independent variables and business competitiveness, demonstrating partial mediation.

This study is limited to Generation Z entrepreneurs in Bogor City using cross-sectional data, which may limit generalizability. Future research should expand the geographic scope and employ longitudinal designs to capture dynamic changes over time.

The findings provide actionable recommendations for Generation Z entrepreneurs to optimize digital marketing strategies, enhance technology-based HR capabilities, and foster digital innovation to strengthen their online business competitiveness in an increasingly digital marketplace.

This study contributes to the literature by integrating digital marketing strategy, technology-based HRM, and digital innovation into a single structural model, specifically targeting Generation Z entrepreneurs in the context of Indonesian online business ecosystems.

**Keywords:** *Digital Marketing Strategy, Technology-Based HR Development, Digital Innovation, Online Business Competitiveness, Generation Z*

## INTRODUCTION

The rapid advancement of digital technology has fundamentally transformed the business landscape worldwide, creating unprecedented opportunities and challenges for entrepreneurs. In Indonesia, the digital economy has experienced remarkable growth, driven by an internet penetration rate exceeding 77% of the population as of 2024, positioning the country as one of the largest digital markets in Southeast Asia. This digital proliferation has catalyzed the emergence of numerous online businesses, particularly among the younger demographic known as Generation Z (Verhoef et al., 2021).

Generation Z, born between 1997 and 2012, represents the first generation to have grown up entirely immersed in digital technologies. They possess distinctive characteristics in terms of technology utilization, creativity, and entrepreneurial orientation that distinguish them from previous generations (Priporas et al., 2017). Data from the Indonesian Central Bureau of Statistics (BPS) indicate a steady increase in the proportion of young entrepreneurs in Indonesia, with a significant majority operating in the online business sector. In Bogor City, this phenomenon is equally evident, as an increasing number of Generation Z individuals leverage digital platforms such as marketplaces, social media, and websites to establish and operate their businesses.

However, not all online business operators can sustain their competitive position in the increasingly saturated digital marketplace. The challenges they face include intense price competition, constantly evolving platform algorithms, and the continuous demand for updated digital competencies. Within this context, digital marketing strategy and technology-based human resource development emerge as two critical factors hypothesized to influence online business competitiveness (Kannan & Li, 2017; Cascio & Montealegre, 2016).

Digital marketing strategy refers to a marketing approach that utilizes digital channels to reach, attract, and retain customers. According to Chaffey and Ellis-Chadwick (2019), effective digital marketing strategies encompass content marketing, social media marketing, search engine optimization (SEO), and email marketing. The proper implementation of these strategies enables business operators to reach broader markets with greater cost efficiency compared to conventional marketing approaches. Several empirical studies have demonstrated the positive impact of digital marketing on business performance (Kannan & Li, 2017; Wardaya et al., 2019).

Concurrently, technology-based human resource development plays a crucial role in enhancing business competitiveness. Dessler (2020) posits that technology-oriented HR development

encompasses digital training, technological literacy enhancement, platform adaptation, and digital certification acquisition. Entrepreneurs with high technological capabilities tend to be more adaptive and responsive to market changes. The Resource-Based View (RBV) theory proposed by Barney (1991) further supports this notion by emphasizing that high-quality human resources constitute strategic assets capable of providing sustained competitive advantages.

Beyond these two factors, digital innovation is hypothesized to serve as a mediating variable bridging the influence of digital marketing strategy and technology-based HR development on online business competitiveness. Rogers (2003) defines innovation as an idea, practice, or object perceived as new by an individual or other unit of adoption. In the digital business context, innovation encompasses the development of new digital-based products or services, business process automation, and the creation of innovative business models. Nambisan et al. (2017) emphasize that digital innovation has become increasingly central to understanding value creation and competitive dynamics in contemporary business environments.

Despite extensive research examining digital marketing strategy and HR development independently, a notable research gap exists regarding the integration of both variables within a single research model, particularly incorporating digital innovation as a mediating variable. Furthermore, research specifically targeting Generation Z entrepreneurs in Bogor City remains significantly limited. This study therefore aims to address these gaps by analyzing the effect of digital marketing strategy and technology-based HR development on online business competitiveness with digital innovation as a mediating variable among Generation Z entrepreneurs in Bogor City.

The theoretical contribution of this research lies in the development of an integrated model combining marketing, human resource management, and innovation management perspectives to explain online business competitiveness. Practically, the findings are expected to provide actionable insights for young entrepreneurs seeking to enhance their competitive positioning in the digital marketplace.

## **LITERATURE REVIEW**

### **Digital Marketing Strategy**

Digital marketing constitutes marketing activities conducted through digital media by leveraging internet and information technology to expand market reach (Kotler & Keller, 2021). According to Kannan and Li (2017), digital marketing encompasses a broad spectrum of activities including search engine optimization, social media marketing, content marketing, email marketing, and mobile marketing, all designed to create value for consumers and organizations in the digital environment. The strategic dimension of digital marketing involves the integration of these diverse channels to create cohesive and effective customer engagement experiences.

Content marketing focuses on creating and distributing valuable content to attract and retain target audiences (Holliman & Rowley, 2014). Social media marketing leverages social networking platforms to build relationships with customers and enhance brand awareness (Dwivedi et al., 2021). SEO and SEM aim to increase business visibility in search engines, while email marketing provides more personalized communication channels with customers. Lamberton and Stephen (2016) highlight

that digital and social media marketing has evolved significantly, with new tools and platforms continuously reshaping how firms interact with consumers.

Empirical evidence supports the positive relationship between digital marketing strategy and business performance. Wardaya et al. (2019) found that digital marketing capabilities significantly mediate the relationship between dynamic capabilities and firm performance among Indonesian SMEs. Similarly, Hendrawan et al. (2019) demonstrated that digital marketing implementation positively influences sales performance of small businesses in Indonesia.

### **Technology-Based Human Resource Development**

Technology-based human resource development refers to systematic efforts to enhance individual competencies and capabilities through digital technology utilization (Dessler, 2020). This concept encompasses four primary dimensions: digital literacy, technology training, platform adaptation, and digital certification. Digital literacy includes the ability to operate digital devices and platforms and to understand data analytics. Technology training relates to structured digital skill development programs. Platform adaptation refers to the speed and ability to adopt new technologies and platforms. Digital certification reflects formal recognition of digital competencies possessed.

The Resource-Based View (RBV) theory proposed by Barney (1991) provides a robust theoretical foundation for understanding the role of technology-based HR development in achieving competitive advantage. According to RBV, resources that are valuable, rare, inimitable, and non-substitutable (VRIN) can serve as sources of sustained competitive advantage. In the digital era, technology-related competencies represent core capabilities that distinguish successful organizations from their competitors. Cascio and Montealegre (2016) further emphasize that investment in technology-based HR development yields significant improvements in productivity and innovation. Teece et al. (1997) extend this perspective through the dynamic capabilities framework, arguing that firms must continuously build and reconfigure their competencies to address rapidly changing environments.

### **Digital Innovation**

Digital innovation is defined as the creation and implementation of new products, processes, or business models enabled by digital technology (Nambisan et al., 2017). In this study, digital innovation encompasses three primary dimensions: product innovation, process innovation, and business model innovation. Product innovation relates to the development of new digital-based products or services. Process innovation involves the automation and digitalization of operational processes. Business model innovation encompasses the creation of new approaches to creating, delivering, and capturing value through digital channels.

Schumpeter (1934) posited in his theory of entrepreneurial innovation that innovation serves as the driving engine of economic growth and competitiveness. In the context of digital business, innovation emerges as a critical mediating factor because effective marketing strategies and capable human resources drive innovation creation, which subsequently enhances business competitiveness (Tidd & Bessant, 2021). Bharadwaj et al. (2013) further argue that digital business strategy, which is

inherently innovation-driven, enables firms to leverage digital resources for competitive advantage. Verhoef et al. (2021) identify digital innovation as a central element across all three stages of digital transformation: digitization, digitalization, and full digital transformation.

### **Online Business Competitiveness**

Online business competitiveness refers to a firm's ability to maintain and improve its position in the digital marketplace relative to competitors (Porter, 1985). In this study, competitiveness is operationalized through four dimensions: price advantage, service quality, market reach, and customer loyalty. Price advantage reflects the business's ability to offer competitive pricing. Service quality encompasses response speed, customer satisfaction, and store ratings. Market reach relates to geographic coverage, customer base size, and online store traffic. Customer loyalty is measured through repeat purchase rates, customer retention, and Net Promoter Score (NPS).

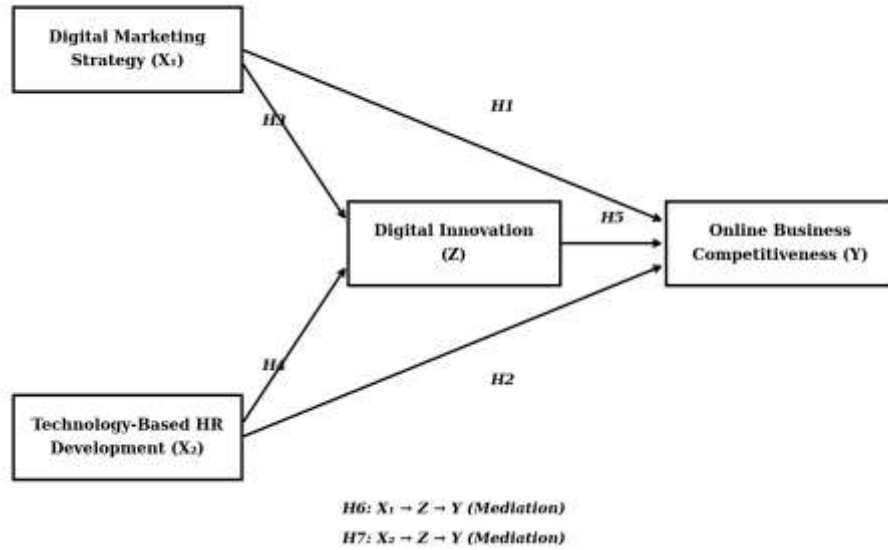
The competitiveness framework in this study integrates perspectives from Porter's (1985) competitive advantage theory with contemporary digital business perspectives. Day (2011) emphasizes that firms must continuously develop adaptive marketing capabilities to maintain competitiveness in rapidly evolving digital markets. Amit and Zott (2001) further contribute by identifying value creation mechanisms in e-business, including novelty, lock-in, complementarities, and efficiency as sources of competitive advantage in digital commerce.

### **Hypothesis Development**

Based on the theoretical framework and empirical evidence reviewed above, this study proposes seven hypotheses examining the direct and indirect relationships among digital marketing strategy, technology-based HR development, digital innovation, and online business competitiveness. The detailed hypotheses and research framework are presented in the Method section.

## **METHOD**

The research framework for this study is developed to systematically examine the influence of digital marketing strategy and technology-based human resource development on online business competitiveness, with digital innovation serving as a mediating variable, in the context of Generation Z entrepreneurs in Bogor City. This structured model serves as the foundation for hypothesis testing and provides a clear path for analyzing how each independent variable contributes to online business competitiveness, both individually and collectively, as well as through the mediating mechanism of digital innovation. The framework illustrates five direct effects (H1–H5) and two indirect mediation effects (H6–H7). The Figure is shown below:



**Figure 1. Research Framework**

Source: Research Result, 2025

Based on the theoretical framework and literature review, the following hypotheses are proposed:

- H1:** Digital marketing strategy has a significant positive effect on online business competitiveness of Generation Z entrepreneurs in Bogor City.
- H2:** Technology-based HR development has a significant positive effect on online business competitiveness of Generation Z entrepreneurs in Bogor City.
- H3:** Digital marketing strategy has a significant positive effect on digital innovation of Generation Z entrepreneurs in Bogor City.
- H4:** Technology-based HR development has a significant positive effect on digital innovation of Generation Z entrepreneurs in Bogor City.
- H5:** Digital innovation has a significant positive effect on online business competitiveness of Generation Z entrepreneurs in Bogor City.
- H6:** Digital innovation mediates the effect of digital marketing strategy on online business competitiveness of Generation Z entrepreneurs in Bogor City.
- H7:** Digital innovation mediates the effect of technology-based HR development on online business competitiveness of Generation Z entrepreneurs in Bogor City.

This study employs a quantitative method with a causal approach (explanatory research) aimed at explaining cause-and-effect relationships between variables. The research population consists of all Generation Z entrepreneurs (born 1997–2012) who operate online businesses in Bogor City. The sampling technique utilizes purposive sampling with the following criteria: (1) the respondent is a

Generation Z individual aged 13–28 years; (2) possesses an active online business operating for at least one year; and (3) is domiciled in Bogor City.

Following the guidelines established by Hair et al. (2019), the minimum sample size for SEM-PLS analysis is ten times the largest number of structural paths directed at a particular latent variable. Considering the model complexity, this study determines a sample size of 170 respondents. The research instrument consists of a questionnaire developed based on indicators derived from each research variable. The questionnaire employs a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) and is distributed online through Google Form.

The independent variables in this study comprise Digital Marketing Strategy ( $X_1$ ) with 12 indicators across four dimensions (content marketing, social media marketing, SEO/SEM, and email/affiliate marketing) and Technology-Based HR Development ( $X_2$ ) with 12 indicators across four dimensions (digital literacy, technology training, platform adaptation, and digital certification). The mediating variable is Digital Innovation ( $Z$ ) with 9 indicators across three dimensions (product innovation, process innovation, and business model innovation). The dependent variable is Online Business Competitiveness ( $Y$ ) with 12 indicators across four dimensions (price advantage, service quality, market reach, and customer loyalty).

Data analysis utilizes Structural Equation Modeling-Partial Least Square (SEM-PLS) with SmartPLS 4 software. The analysis is conducted in two stages: measurement model evaluation (outer model) and structural model evaluation (inner model). The outer model evaluation includes convergent validity testing ( $AVE > 0.50$ ), discriminant validity testing (Fornell-Larcker criterion and HTMT), and reliability testing (Composite Reliability  $> 0.70$  and Cronbach’s Alpha  $> 0.70$ ). The inner model evaluation encompasses the coefficient of determination ( $R^2$ ), predictive relevance ( $Q^2$ ), effect size ( $f^2$ ), and hypothesis testing through bootstrapping with 5,000 subsamples. Mediation analysis is performed by examining specific indirect effects through the bootstrapping procedure (Hair et al., 2019; Henseler et al., 2015).

**Table 1. Operationalization of Research Variables**

Variable	Dimension	Indicators
Digital Marketing Strategy ( $X_1$ )	Content Marketing	Content quality, posting consistency, product storytelling
	Social Media Marketing	Engagement rate, follower count, customer interaction
	SEO/SEM	Search engine visibility, keyword usage, paid advertising
	Email & Affiliate Marketing	Message personalization, campaign conversion, affiliate collaboration
Technology-Based HR Development ( $X_2$ )	Digital Literacy	Platform operation ability, data analytics comprehension
	Technology Training	Training frequency, training type, training application
	Platform Adaptation	New platform adoption speed, business tool utilization

	Digital Certification	Certification ownership, certification-business relevance
Digital Innovation (Z)	Product Innovation	Digital-based product/service development, new features
	Process Innovation	Operational automation, digital supply chain efficiency
	Business Model Innovation	Sales channel diversification, new business models
Online Business Competitiveness (Y)	Price Advantage	Ability to offer competitive pricing
	Service Quality	Response speed, customer satisfaction, store rating
	Market Reach	Geographic coverage, customer base, online store traffic
	Customer Loyalty	Repeat orders, customer retention, Net Promoter Score

Source: Compiled by Researchers, 2025

## RESULTS AND DISCUSSION

### Respondent Characteristics

Based on the data collection through the online questionnaire, 170 respondents meeting the purposive sampling criteria were obtained. The gender distribution shows that 58.2% of respondents are female and 41.8% are male. In terms of age distribution, the majority of respondents are aged 22–25 years (47.1%), followed by 18–21 years (35.3%) and 26–28 years (17.6%). Regarding the type of online business, the majority operate in fashion and accessories (32.4%), food and beverages (24.7%), digital products (18.8%), beauty and health (14.1%), and others (10.0%). In terms of business duration, most respondents have operated their online businesses for 1–2 years (42.9%), followed by 2–3 years (31.8%), and more than 3 years (25.3%).

### Measurement Model Evaluation (Outer Model)

The outer model evaluation was conducted to assess the validity and reliability of the research instruments. Convergent validity results show that all indicators have outer loading values above 0.70 and Average Variance Extracted (AVE) values above 0.50 for each latent variable, confirming that all indicators are valid measures of their intended constructs (Hair et al., 2019).

**Table 2. Convergent Validity and Reliability Results**

Variable	AVE	CR	Cronbach's $\alpha$	Status
Digital Marketing Strategy (X <sub>1</sub> )	0.628	0.953	0.945	Valid & Reliable
Tech-Based HR Development (X <sub>2</sub> )	0.591	0.945	0.936	Valid & Reliable
Digital Innovation (Z)	0.654	0.944	0.929	Valid & Reliable
Online Business Competitiveness (Y)	0.612	0.950	0.941	Valid & Reliable

Source: SmartPLS 4 Output, 2025

Discriminant validity was assessed using the Fornell-Larcker criterion and Heterotrait-Monotrait Ratio (HTMT). The analysis results show that the square root of AVE for each variable exceeds the inter-variable correlations, and all HTMT values are below the recommended threshold of 0.85 (Henseler et al., 2015). These findings confirm that each latent variable possesses adequate discriminant validity, ensuring that the constructs measured are conceptually distinct from one another.

**Structural Model Evaluation (Inner Model)**

The inner model evaluation begins with the coefficient of determination ( $R^2$ ) analysis. The results indicate that the  $R^2$  value for Digital Innovation (Z) is 0.587, meaning that 58.7% of the variance in Digital Innovation can be explained by Digital Marketing Strategy and Technology-Based HR Development. The  $R^2$  value for Online Business Competitiveness (Y) is 0.714, indicating that 71.4% of the variance in Online Business Competitiveness is explained by Digital Marketing Strategy, Technology-Based HR Development, and Digital Innovation collectively. Both  $R^2$  values are categorized as substantial according to Chin (1998). The predictive relevance values ( $Q^2$ ) for both endogenous variables are positive ( $Z = 0.372$ ;  $Y = 0.421$ ), demonstrating that the model possesses adequate predictive capability.

**Table 3. Hypothesis Testing Results (Direct Effect)**

Hypothesis	Path Coefficient	T-Statistics	P-Values	Decision
H1: $X_1 \rightarrow Y$	0.285	3.842	0.000	Supported
H2: $X_2 \rightarrow Y$	0.231	3.156	0.002	Supported
H3: $X_1 \rightarrow Z$	0.412	5.273	0.000	Supported
H4: $X_2 \rightarrow Z$	0.378	4.891	0.000	Supported
H5: $Z \rightarrow Y$	0.347	4.528	0.000	Supported

Source: SmartPLS 4 Output, 2025

**Table 4. Mediation Testing Results (Indirect Effect)**

Hypothesis	Indirect Effect	T-Statistics	P-Values	Decision
H6: $X_1 \rightarrow Z \rightarrow Y$	0.143	3.412	0.001	Partial Mediation
H7: $X_2 \rightarrow Z \rightarrow Y$	0.131	3.187	0.001	Partial Mediation

Source: SmartPLS 4 Output, 2025

**Discussion**

The first hypothesis (H1) testing results demonstrate that digital marketing strategy has a positive and significant effect on the online business competitiveness of Generation Z entrepreneurs in Bogor City ( $\beta = 0.285$ ;  $t = 3.842$ ;  $p = 0.000$ ). This finding is consistent with prior research by Wardaya et al. (2019) and Hendrawan et al. (2019), which established that effective digital marketing strategies enhance business performance and competitiveness. Generation Z entrepreneurs who implement quality content marketing, actively engage on social media platforms, and optimize their SEO strategies are demonstrably capable of expanding their market reach and increasing customer

engagement, ultimately strengthening their competitive position in the digital marketplace. This finding also aligns with the broader digital marketing framework proposed by Kannan and Li (2017), which posits that integrated digital marketing efforts create synergistic effects that enhance firm performance beyond what individual channels can achieve.

The second hypothesis (H2) is also supported, with technology-based HR development showing a positive and significant effect on online business competitiveness ( $\beta = 0.231$ ;  $t = 3.156$ ;  $p = 0.002$ ). This result is consistent with the Resource-Based View theory (Barney, 1991), which emphasizes that high-quality human resources constitute a source of competitive advantage. Generation Z entrepreneurs who actively develop their digital literacy, participate in technology training programs, and adapt to the latest digital platforms possess superior capabilities in managing and growing their online businesses. The finding further corroborates the work of Cascio and Montealegre (2016), who demonstrated that technology-oriented HR investments yield significant returns in terms of productivity and innovation capacity. This also reflects what Teece et al. (1997) describe as dynamic capabilities, the organizational ability to sense, seize, and transform in response to changing technological environments.

The third (H3) and fourth (H4) hypotheses confirm that digital marketing strategy ( $\beta = 0.412$ ;  $t = 5.273$ ;  $p = 0.000$ ) and technology-based HR development ( $\beta = 0.378$ ;  $t = 4.891$ ;  $p = 0.000$ ) each have positive and significant effects on digital innovation. These findings indicate that the implementation of diverse digital marketing strategies and the development of technology-based HR capabilities stimulate innovation in products, processes, and business models. The strong effect of digital marketing strategy on innovation suggests that exposure to diverse digital channels and customer feedback mechanisms creates opportunities for entrepreneurs to identify and respond to market needs innovatively. This aligns with the conceptualizations of Nambisan et al. (2017), who argue that digital technologies possess inherent generative properties that enable continuous and emergent innovation beyond planned organizational boundaries.

The fifth hypothesis (H5) confirms that digital innovation has a positive and significant effect on online business competitiveness ( $\beta = 0.347$ ;  $t = 4.528$ ;  $p = 0.000$ ). Entrepreneurs capable of innovating digitally, whether through product development or business process optimization, demonstrate higher levels of competitiveness. This finding is consistent with Tidd and Bessant (2021), who assert that innovation constitutes a key determinant of business sustainability and growth in the digital era. Additionally, this supports the theoretical arguments of Bharadwaj et al. (2013) regarding the critical role of digital strategy in enabling firms to create and capture value through innovation. The result also echoes Amit and Zott's (2001) framework, where novelty-centered business models in e-commerce environments generate superior value for both firms and customers.

The mediation analysis results reveal that digital innovation partially mediates the effect of digital marketing strategy on online business competitiveness (H6: indirect effect = 0.143;  $t = 3.412$ ;  $p = 0.001$ ) and the effect of technology-based HR development on online business competitiveness (H7: indirect effect = 0.131;  $t = 3.187$ ;  $p = 0.001$ ). The partial mediation indicates that digital marketing strategy and technology-based HR development not only directly influence competitiveness but also indirectly enhance it through improved digital innovation capabilities. This finding contributes novel

insights to the existing literature by confirming the role of digital innovation as a mediating mechanism connecting marketing strategies and HR capabilities with business competitiveness. The partial rather than full mediation suggests that the direct pathways from both independent variables to competitiveness remain meaningful, indicating that digital marketing and HR development contribute to competitiveness through both innovation-dependent and innovation-independent mechanisms.

## **CONCLUSION**

Based on the research findings and discussion presented above, several important conclusions can be drawn. First, digital marketing strategy has a positive and significant effect on online business competitiveness among Generation Z entrepreneurs in Bogor City. The integrated implementation of content marketing, social media marketing, SEO/SEM, and email marketing proves effective in expanding market reach and enhancing customer engagement. Second, technology-based HR development has a positive and significant effect on online business competitiveness. The enhancement of digital literacy, participation in technology training programs, and adaptation to new digital platforms strengthen the entrepreneurial capabilities needed to manage online businesses effectively.

Third, digital innovation successfully mediates the effect of both digital marketing strategy and technology-based HR development on online business competitiveness through partial mediation. This demonstrates that marketing strategies and HR capabilities not only have direct effects but also stimulate digital innovation, which subsequently enhances business competitiveness. The integrated model developed in this study contributes to the marketing management and HRM literature by providing a comprehensive framework for understanding competitive advantage formation in the digital business context.

The theoretical contribution of this study lies in providing an integrated model that explains the interrelationships among digital marketing strategy, technology-based HR development, digital innovation, and online business competitiveness within the specific context of Generation Z entrepreneurs. This enriches the existing management literature by bridging the marketing, HRM, and innovation management domains in the digital era.

The limitations of this study include its geographic scope, which is confined to Bogor City, and its specific focus on Generation Z, which may limit the generalizability of findings to other regions and generational cohorts. Additionally, the cross-sectional research design does not capture the dynamic evolution of variables over time. Future research is recommended to expand the geographic and demographic scope, employ longitudinal research designs, and incorporate additional moderating variables such as government policy support, digital infrastructure quality, or platform ecosystem characteristics to further enrich our understanding of online business competitiveness determinants.

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### **CONFLICT OF INTEREST**

The authors declare that there is no conflict of interest in the conduct and publication of this article.

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