ECONOMIC COMPETITIVENESS OF SMEs: DIGITAL LITERACY, THE MEDIATING ROLE OF DIGITAL TRANSFORMATION AND INNOVATION CAPABILITY

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ABSTRACT

Objectives*: The objective of this study is to predict and analyze the mediating role of digital transformation (DT) innovation capability (IC) and digital literacy (DL) on the relationship between digital literacy (DL) and economic competitiveness (CP) of SMEs, by proposing a model construction.*
Methodology*: The survey method was carried out by distributing research instruments to 99 respondents, the collected data was used to analyze the relationship between digital literacy, digital transformation, innovation ability, and competitiveness, and also used to test hypotheses. Evaluation of predictions through structural equation models with partial least squares-structural equation modeling (PLS-SEM).*
Finding*: DL directly has a significant positive effect on CP. DL has a significant positive influence on DT. DL has a significant positive effect on IC. DT has a significant positive effect on CP. DT has a significant positive effect on IC. DT and IC serially have a mediating effect on the effect of DL on CP, each moderately mediating effect.*
Conclusion*: The results of model measurement and the results of the evaluation of model suitability show that model suitability is achieved and guarantees model suitability. The results of the structural model path analysis show that all hypotheses are accepted, DT and IC serially have a mediating effect on the influence of DL on the economic competitiveness of SMEs. The novelty findings of this research produce a model of the economic competitiveness of SMEs in the digital economy era, which involves DL, DT, and IC. The implication is that to improve the effectiveness of highly competitive businesses in this era, DL, digital competence and digital transformation capabilities of human resources (HRDT) among SMEs need to be carefully prepared, and IC must be improved.*

Keywords: *digital literacy; digital transfomation; innovation capability; economic competitiveness*

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are crucial to a country's socio-economic growth and development as they are an important part of the global supply chain. Shiratina et al (2022) In Indonesia, MSMEs support the national economy. The large contribution of MSMEs to the Gross Domestic Product (GDP) in 2021 reached 61.07 percent or worth IDR 8,573.89 (Kemenkeu RI, 2022). The resilience and revival of MSMEs affect the superiority of competitiveness and national economic performance after COVID-19 (Wahdiniwaty & Firmansyah, 2022). An extraordinary phenomenon, the COVID-19 pandemic has had a serious impact on health, the economy, transportation, and other industrial crises including MSME players (Saepuloh & Firmansyah, 2022; Wahdiniwaty et al., 2022; Arief, H, 2022). On the other hand, the development of the digital economy is underway, business digitalization in the Industrial Revolution (IR) 4.0 era shows the deviation of past expectations from MSME players, this signal has been seen with the massive progress and use of the Internet of Things (IoT) has disrupted various aspects of human life, especially in the economic field (Firmansyah, Suryana, & Rifa'i, 2022), Even now it has begun to enter the era of society 5.0. The development of digital technology is very helpful for MSME players to expand their market share quickly without having to meet directly with customers (Firmansyah & Saepuloh, 2022). This condition is an opportunity for MSME actors to rise, and move up, MSMEs that are advanced, independent, and competitive and contribute to the national economy, of course, must be able to transform from conventional business to digital (Firmansyah et al., 2021). Where, the guarantee of sustainable success can be operationalized by the ability to adopt and practice digitalization, as well as maximum use of technology (Lembono & Layman, 2023).

Digital transformation is a topical issue worldwide, so important for all business actors in all sectors, because it can transform customer relationships, internal processes, and value creation (Zaoui & Souissi, 2020). Adaptation and transformation are the keys to success for MSMEs to survive, rise, and develop in the digital era, especially where the business and market environment is rapidly changing (Firmansyah & Saepuloh, 2022a). Technological advances as a driver of massive change and digital business as a form of adaptation are now becoming trends (Nurani et al., 2023). Agility, innovative business behaviors and models, and adaptability are needed to maintain efficiency and have strong resilience in a market disrupted by digitalization practices (Reniati et al., 2023). The ability to adapt to high concepts with company-specific demands is a key factor in supporting SMEs to take advantage of technological opportunities in connection with the digitization process (Fechtelpeter et al., 2017). However, digital transformation is more than just the use of technology, it must also consider changes in talent, culture, and organizational structure (Kane et al., 2017). The implication is that individuals and business actors need to prepare and improve digital skills and readiness that are potentially needed in this era (Firmansyah, Rifa'i, et al., 2022). , the skill needed for business processes has changed renewably along with technology is digital literacy. Digital literacy emerged alongside the evolution of the internet and demanded knowledge of how to access, search, and critically analyze information (Liu et al., 2020; Farias-Gaytan et al., 2022; Firmansyah, 2022a). Although it must be emphasized that digital transformation is not about a single technology, but a major change based on a combination of information technology, computing, communication, and connectivity (Bharadwaj et al., 2013; Cichosz et al., 2020).
MSME creativity includes creative aspects of personality, motivation, intelligence, thinking style, and relevant knowledge (Mcmullan & Kenworthy, 2016). The process of continuous

innovation is very important for business development in the modern era, in terms of profit generation and competitiveness (Marković et al., 2020), so that sustainable business growth can be achieved with innovation capabilities (Rachbini et al., 2023). Where the creation and exploitation of knowledge play an important role in better positioning companies in the global market to strengthen business performance amid intense competition. (Ramli et al, 2022) The ability of business actors to utilize technology maturely is increasingly important to pay attention to support the success of their businesses in this era (Hamdani et al., 2024). Therefore, the exploitation and integration of digital technology often affect most companies at various scales and even beyond their limits, by affecting products, business processes, sales channels, and supply chains to be able to create sustainable competitive advantages (Firmansyah & Saepuloh, 2022). The digital transformation process explains the importance of multiliteracy to support the innovation process to strengthen competitiveness (Krumsvik, 2015). The thinking and innovation capabilities of SMEs in the digital economy era are greatly influenced by the transformation of human resources and digital talent (Budiarti & Firmansyah, 2024).

Interestingly, until now, MSME players who have succeeded in transforming their business into a digital ecosystem are 16,9 million business actors (KemenkopUKM, 2021). Around 74 percent of Indonesian MSMEs are aware of the presence of *e-commerce*, but only 20 percent of MSME players can carry out digital transformation. CEO and Co-Founder of Blibli, Kusumo Martono at the Virtual MSMEs (Update 2021), event side by side with the Minister of SOEs, conveyed the results of MSME Digitalization research conducted by Blibli with Kompas Daily and Boston Consulting Group (BCG), that around 28,8 percent of MSME players are still hesitant to carry out digital transformation, and 27 percent feel that they lack understanding of digital literacy. The lack of ability to carry out digital transformation is closely related to low digital literacy resulting in low innovation capabilities which have implications for the competitive advantage of MSMEs in the current digital economy era.

The results of a study conducted by the Ministry of Communication and Information and KIC 2020, on a scale of 1-5 by measuring four sub-indices of digital literacy readiness, namely the information and data literacy sub-index reached an index of 3,17, the communication and collaboration index reached 3,38, the then security index reached 3.66, and the readiness of technological capabilities was at an index of 3,66, the national digital literacy index has not reached a good level(Wibowo, 2021). Meanwhile, Sulistianingsih et al., (2021), said that from the highest score of 5 and the lowest of 1, the national digital literacy index is only 3,47, which means that there are indications that scattered and affordable internet access has not been accompanied by an increase in people's ability to process information and think critically. This condition shows that there is still low digital literacy of human resources which has an impact on the ability of MSME transformation and digitalization practices, which has implications for their low innovation capabilities and competitiveness. This situation is reinforced by the statement of Menparekraf (2022), that MSMEs still need support from the government and other relevant partners to improve digital transformation capabilities to be able to encourage the birth of innovations in the digital ecosystem so that MSMEs have better competitiveness and stability in the digital economy era.

Referring to this reality, to improve the successful and sustainable digital transformation of MSMEs, it is considered necessary to pay attention to digital literacy readiness as a competency requirement that must be possessed by MSME human resources, so that digital transformation

practices are not just switching business processes from traditional practices to go digital, but more than that. Where the digital literacy of MSME human resources will guide how the search and management of digital information from various websites related to personal movements of customers and competitors is developed which leads to an adaptation process that must be carried out to give birth to thinking and innovation capabilities to survive with better sustainable competitiveness. Empirical facts that have occurred have initiated this research, that to improve the digital transformation ability of MSMEs that are successful, and able to create innovative thinking and capabilities so that they have an impact on the superiority of sustainable MSME competitiveness, it must be started by paying attention to the readiness of digital literacy of human resources of MSME actors.

However, as far as our knowledge is recognized, there has been a lot of literature on the success of MSME digital transformation practices and innovation capabilities in increasing MSME competitiveness. However, there is no complete study that offers a model of MSME competitiveness that considers the relationship between digital literacy and digital transformation practices by taking into account the role of mediating innovation capabilities. Where the digital literacy aspect is the starting point for MSME HR competencies that must be prepared to be mastered as core competencies relevant to digitalization issues to ensure the success of digital transformation practices and increase innovation capabilities so that it has implications for better and sustainable MSME competitiveness in the digital economy era. The existing literature focuses more on technological and environmental factors to trigger the success of digital transformation and then encourage the birth of innovation capabilities (e.g., Zhang et al., 2022; Ferreira et al., 2019); how digital technologies are triggering business change that emphasizes the importance of developing innovations to improve business competitiveness at the MSME level of the South Apulia-Italy region (e.g., Garzoni et al., 2020); study of nine elements of digital transformation and the use of technology to increase business competitiveness towards global reach (Westerman et al., 2014); study of nine elements of digital transformation and the use of technology to increase business competitiveness towards global reach (e.g., Ulas, 2019).

Research Gap

Other relevant literature studies that have been conducted include the reasons and impacts of digital transformation, as well as the importance of digital competence to improve innovation capabilities (by Morze & Strutynska, 2021; Krumsvik, 2015); predicting dynamic capabilities as one of the keys to a firm's competitive advantage mediated by creativity and innovation (e.g., Ferreira et al., 2020); investigation of the uncertainty of digitalization/digital transformation of HR (Morze & Strutynska, 2021); context in Indonesia, entrepreneurial performance models in the digital economy era that consider digital literacy, digital transformation practices and new marketing mixes by considering the mediating role of marketing orientation (e.g., Firmansyah, Wahdiniwaty, et al., 2023); The competitiveness of MSMEs in the digital era is predicted by economic literacy and digital literacy by placing the role of innovation mediation to bridge the achievement of sustainable competitiveness (for example, Firmansyah, 2022a). There is an important *theoretical gap* to be filled that has the potential to provide a more comprehensive view of the success of business digitalization after technology adoption and provide an understanding of how the role of HR digital literacy as a core competency and digital talent that

must be mastered properly to ensure the success of digital transformation practices to increase innovation capabilities towards achieving sustainable MSME competitiveness stability.

This research explores the relationship between digital literacy (DL), digital transformation (DT), and innovation ability (IC) to predict economic competitiveness (CP). The mediating effects of digital transformation (DT) and innovation capability (IC) were examined on the relationship between DL and CP. The initial incision underlying the importance of this research was made to fill the existing gap, referring to the findings of the synthesized gap between the empirical gap and the research gap described in the previous section. The originality and novelty of this study consider digital literacy and places it as a pure predictor that explains digital transformation, innovation capabilities, and competitiveness of MSMEs, as well as a set of core competencies that must be mastered by MSME actors to ensure the success of digital transformation practices to achieve increased innovation capabilities and sustainable competitiveness in the digital economy era.

The unit of analysis of this research is SME actors spread across various regions in West Java, Indonesia. Where business potential in the region can be explored and developed along with the shift to traditional business practices, face-to-face that relies on visitors who come to digital practices along with the emergence of various digital platforms as a place to market products (marketplace) digitally or a combination of both. The existence of innovation capabilities is needed to encourage and ensure the success of business model transformation practices in a new face that is flexible and more adaptive in responding to changes in the business environment in the digital economy era to create a new business environment to create innovations. can survive and continue to grow with better performance and competitiveness on an ongoing basis. The contribution of this research broadens the horizons of the effectiveness of highly competitive businesses in this era, where digital skills and digital transformation capabilities must be prepared, and innovation capabilities must be improved.

LITERATURE REVIEW
Digital Literacy

Many things are part of digital literacy that are not touched and claimed to be part of it, this includes the presentation of information, without including creative writing and visualization (Firmansyah, 2022a). It covers the evaluation of information, without claiming systematic review and metaanalysis as its own, and includes the organization of information but does not claim the construction and operation of terminology, taxonomy, and thesauri (Koltay, 2011).

Digital competence and digital literacy are concepts that are increasingly used in public discourse (Spante et al., 2018), although they still find there are intersections and similarities with other areas of literacy (Pangrazio et al., 2020). Digital literacy is defined as a broader and more complex set of skills than the simple use of digital technologies (Biezā, 2020), the most important of which is the need to 'contextualize the internet and ways of presenting information to other non-networked forms. Iordache et al., (2017), grouped digital literacy indicators, including operational and technical, digital information and communication literacy, media literacy, digital learning skills, and digital and strategic content creation. Digital skills can increase ICT use, social media transformation and engagement, capabilities, SME competitiveness innovation (Rozak et al., 2021)

Digital Transformation

Digital transformation practices are relevant to the demands of change, as well as being part of marketing strategies so that businesses can survive (Firmansyah, Wahdiniwaty, et al., 2023). Because, digital business transformation is an objective process that responds to changes in the business environment (Firmansyah & Saepuloh, 2022). Digital transformation is the use of digital technology (Negroponte, 1995; Morze & Strutynska, 2021), which fundamentally increases productivity and corporate value (Westerman et al., 2014). Successful digital Transformation requires organizations and actors involved to have digital literacy readiness and develop various capabilities according to the business context and needs (Reis et al., 2018). Business digital transformation is a form of business model and process innovation to find and create new ones, relevant to the development of the renewable economy in the current digital economy era (Firmansyah, Mulyadi, et al., 2023).

Digital transformation is closely related to the use and alignment of digital technologies within an enterprise, making organizational change, enabling activities, and creating and capturing new opportunities and value (e.g., Jeansson & Bredmar, 2019; Firmansyah & Saepuloh, 2022a). In today's era of renewable economy, the focus of business actors and their personnel from actively competing industries around the world (Morze & Strutynska, 2021), exerts pressure to go digital before anyone else does, striving to survive and achieve competitive advantage (following, Bharadwaj, 2000; Reis et al., 2018); (Firmansyah et al., 2022). The practice of digital transformation as part of the ability to adapt to high concepts, can simultaneously create innovation capabilities to answer company-specific demands which is a key factor in supporting SMEs to take advantage of technological opportunities in connection with the digitization process (Fechtelpeter et al., 2017). In the digital era, business tourism has shifted from traditional to digital, including for SMEs, business transformation and digitalization are strategic and relevant practices but must be followed by adaptability and continuous innovation to get through it (Wahdiniwaty, Firmansyah, Suryana, et al., 2022).

Innovation Capabilities

Innovation is the elixir of life in the journey of one's life that is full of creativity and appropriate in taking advantage of opportunities to always grow and continue to develop. Innovation is a firm's ability to strategically sense and respond to opportunities and threats increasing competitive advantage (Liu et al., 2014). Innovation is the ability to change more following the demands of the environment that occurs (Herrera, 2015). Measurement of innovation can be seen from investment into technology, innovation processes, product development and marketing, development of new sources of supply, and discovery of new markets. relevant business innovation practices are needed in this era to improve competitiveness better (for example, Firmansyah & Saepuloh, 2022).

Innovation arises from creativity, where creativity includes creative aspects of personality, motivation, intelligence, thinking style, and relevant knowledge (Mcmullan & Kenworthy, 2016). The digital transformation process shows that MSME players have creativity and innovation capabilities in line with changes in the business environment. This innovation capability strengthens the relationship between digital transformation and competitiveness (Darroch & Mazerolle, 2013). Relevant business innovation practices are needed in this era to

improve entrepreneurial performance with better competitiveness (Firmansyah, Wahdiniwaty, et al., 2023)

Economic Competitiveness

Competitiveness is the ability for good performance (Garengo et al., 2005), for another implies the creation and sustainability of sources of competitive advantage (Ceptureanu, 2015). On the other hand, emphasizing the competitive strategy approach (Porter et al., 2008), competitiveness is also a relative concept, relating to how competitive a firm is when compared to other industries. Ajitabh & Momaya (2004), mentioned focusing on key competitiveness resources at the company level and classifying literature related to competitiveness within the asset-process-performance (APP) framework (Ceptureanu, 2015). In the era of the digital economy, digital transformation is a new approach for companies to gain a competitive advantage in the context of fierce and dynamic market competition. Technology and environmental factors drive digital transformation which has a positive impact on the ability of organizations to create their competitiveness, digital literacy plays an important role in adopting technology and adapting the environment for successful digital transformation (Zhang et al., 2022).

The results of research by Ali Qalati et al., (2020), show that digital literacy, organizations, and the environment play an effective role in increasing the competitiveness of SMEs. Meanwhile, RVSPK et al., (2020), found that the digital literacy (DL) dimension has a negative impact on business uncertainty, but has a positive effect on the competitiveness (CP) of SME business actors. Firmansyah & Saepuloh (2022), also found that digital literacy has a positive impact on increasing the competitiveness of SMEs in business processes in the digital economy era. On the other hand, Peter et al., (2020), said that the conceptualization of digital transformation based on mutual understanding, process engineering, new technology, and digital literacy are influential drivers of digital transformation (DT). Factors influencing digital transformation are digital technology and digital competence, due to the importance of digital services and systems for social development (e.g., Pelletier & Cloutier, 2019; Morze & Strutynska, 2021; Fechtelpeter et al., 2017). Wang et al., (2021) found that increasing digital literacy can optimize the digital production environment, digital innovation environment, and educational environment, namely the digital-business environment, which is beneficial for the formation of a fair, balanced, healthy, innovative, and sustainable development environment for the digital economy. Digital literacy readiness affects the innovation capabilities of SMEs (e.g., Shin & Kang, 2021; Anshari & Almunawar, 2022).

Firmansyah et al., (2023), mention the ability to carry out business digital transformation as a form of business model innovation to find and create new ones with a commitment to market orientation, both business processes and products or services that meet expectations and even exceed customer orientation as the target market that is the most important stakeholder, as well as relevant business model and process practices in line with economic development renewable in the current digital economy era so that it will directly or indirectly strengthen the economic competitiveness of small and medium enterprises sustainably. The digital transformation process explains the importance of digital literacy and multiliteracy to support the innovation process to strengthen competitiveness (Krumsvik, 2015). In the era of the digital economy, digital transformation (DT) is a new approach for companies to gain a competitive advantage in the context of fierce and dynamic market competition. Technological and environmental

factors drive digital transformation which has a positive impact on the ability of organizations to create innovation capabilities for their competitiveness, multiliteracy plays an important role in adopting technology and adapting the environment for successful digital transformation (Zhang et al., 2022).

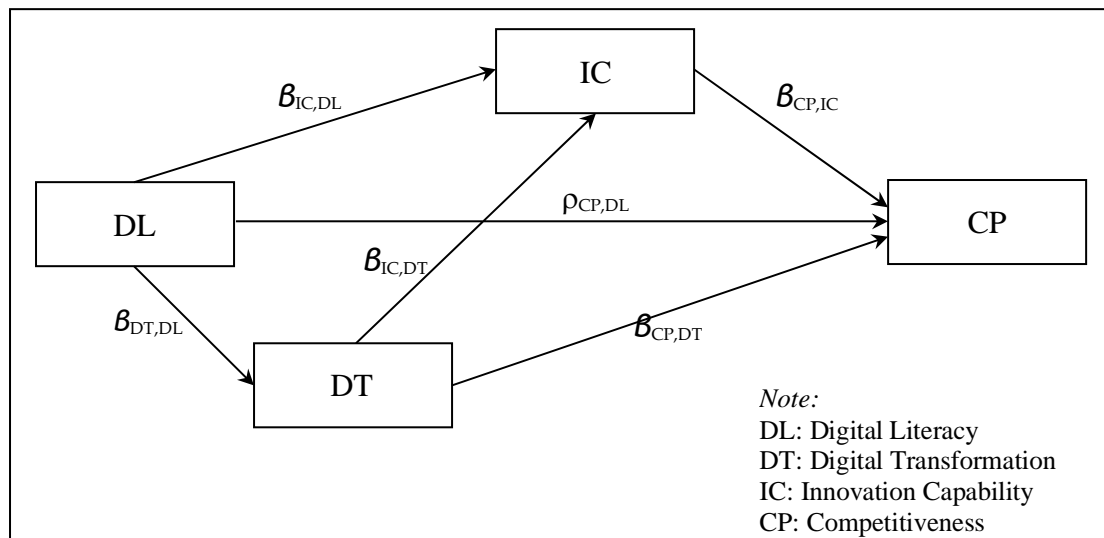The conceptual framework of this research model is depicted in the following figure:

Figure 1. Conceptual framework of the research model
Source: Synthesis of various sources and developed by the Authors (2023)

Research Hypothesis Statement
- H_1 : Digital literacy affects competitiveness
- H_2 : Digital literacy affects digital transformation
- H_3 : Digital literacy affects innovation capabilities
- H_4 : Digital transformation affects competitiveness
- H_5 : Digital transformation affects innovation capabilities
- H_6 : Innovation capability affects competitiveness
- H_7 : Digital transformation mediates the influence of digital literacy on competitiveness
- H_8 : Innovation capabilities mediate the influence of digital literacy on competitiveness
- H_9 : Innovation capabilities mediate the impact of digital transformation on competitiveness
- H_{10} : Digital transformation and innovation capabilities serially mediate the impact of digital literacy on competitiveness

METHOD
This research is a survey research with a quantitative approach. Survey research seeks to quantitatively describe the tendencies, attitudes, or opinions of a particular population by

examining a sample of that population (Creswell, 2014). Quantitative research is an approach to test objective theories by examining relationships between variables (Creswell, 2014). A total of 99 respondents became the sample of this study, selected by purposive sampling techniques developed with convenience sampling techniques related to the ease of reach of respondents ' existence with consideration of existing respondents and can participate in the research (Taherdoost, 2016; Hibberts et al., 2012; Firmansyah, 2022), but understanding and habits of using digital technology are considered. Therefore, the nomination of respondents specifically based on criteria is selected to meet a specific goal. Data collection techniques, face-to-face questionnaire dissemination, and Google Form dissemination through social media, but the combination of both showed better results, guaranteeing that the questionnaire criteria and answers were again accepted according to the number of items questioned related to the concept studied, but the research team remained independent.

Primary data sources are used by deploying research instruments as data collectors, Likert scales ranging from 1-5 are used. Digital literacy (DL) with seven statements (DL1-DL7); digital transformation (DT) with six statements (DT1-DT6); innovation capability (IC) with eight statements (IC1-IC8); and Competitiveness (CP) with seven statements (CP1-CP7). The collected data were analyzed with Partial least squares-structural equation modeling 4 (PLS-SEM4) selected for use in analyzing model construction. Model measurements are based on convergent and discriminant validity, Cα value > 0.70 (Hair et al., 2011), AVE > 0,50 (Henseler et al., 2016), full collinearity of VIF $\leq$ 3.3 (Kock, 2017), Fornell-Larcker criterion (Fornell & Larcker, 1981), and Heterotrait-Monotrait (HTMT) < 0.90 (Hair et al., 2021; Franke & Sarstedt, 2019) or far < 1 (Henseler et al., 2016). Evaluation of model fit, where R^2 ranges values of 0,75, 0,50, and 0.25; strong to low (Henseler et al., 2016; Hair et al., 2019: p.18), the strength of partial or full mediating effect f^2 values ranges from 0.02, 0.15, and 0.35 (Cohen, 1988; Hair et al., 2019: p.19), SRMR < 0.10 fit model achieved (Henseler et al., 2016), NFI criteria refer to Henseler et al., (2016); and Hair et al., (2017). Significance of direct and indirect effect = t stat > 1,96 pada α = 0.05. The magnitude of the structural mediating effect of the pathway, statistical upsilon (v) $= \beta^2_{YM.X} - (R^2_{Y.MX} - \rho^2_{YX})$ (Lachowicz et al., 2018; Ogbeibu et al., 2021), then in this study $v = \beta^2_{IC.DL}\beta_{2IC.DT}\beta_{2CP.IC.DL.DT}$. Effect size criteria = 0.175 strong, 0.075 moderate, and 0.01 small mediated effect (Cohen, 1988; Ogbeibu et al., 2021), which also comes with a VAF value.

RESULTS AND DISCUSSION
Measurement Model
Latent variable constructs are used to check the PLS-SEM measurement model. Convergent -
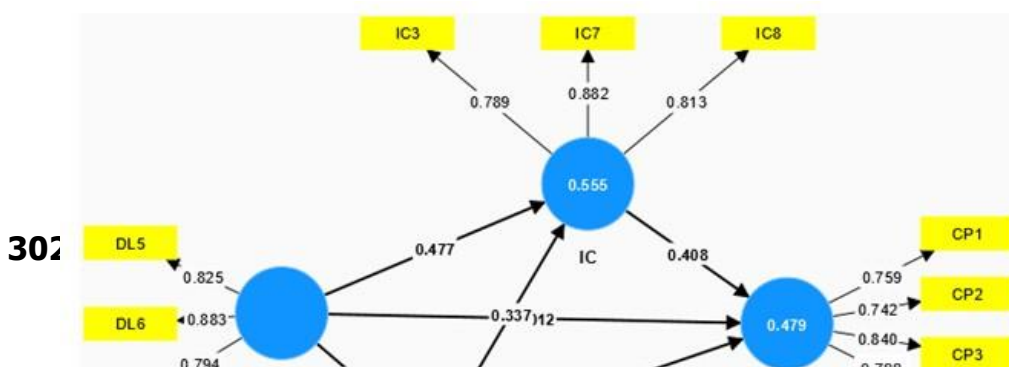
Figure 2. Structural model after factor improvement

and discriminant validity are used to measure the construct of each indicator. Discriminant validity is done to ensure that each construct is similar to the item with other latent constructs improvement of the model for factor analysis is possible, if the loading factor of the latent variable is not at the minimum required value (< 0,60).

The loading factor of the remaining twelve items was received, each having a value of $C\alpha >$ 0,70 (between 0,708 and 0,844) after repairs and as many as nine items from the construct having a value of < 0,70 were discarded. Figure 2 and Table 1, show that each construct of DL, DT, IC, and CP has a value of $C\alpha$ and CR > 0,70, and the required reliability scale is stated to be met (Hair et al., 2011), the construct has a good consistency. In addition, validity is also acceptable (table 1) known AVE values for all constructs are greater than 0.5, constructs have reliability (Henseler et al., 2016), and all three constructs have a match with the model.

Table 1. Model Measurement Results After Repair

Latent Variables	Question items (after factor improvement)	Factors Loading	$C\alpha$	CR	AVE	VIF OM List	VIF IM Matrix
Digital Literacy (DL)	DL5	0.825	0.782	0.873	0.697	1.650	
	DL6	0.883				1.882	2.295
	DL7	0.794				1.511	
Digital Transformation (DT)	DT1	0.830	0.874	0.908	0.665	2.515	
	DT2	0.797				2.317	
	DT4	0.823				1.121	
	DT5	0.811				2.017	2.039
	DT6	0.816				2.001	
Innovation Capability (IC)	IC3	0.789	0.772	0.868	0.687	1.433	
	IC7	0.882				1.851	2.247
	IC8	0.813				1.666	
Competitiveness (CP)	CP1	0.759	0.757	0.844	0.576	1.462	
	CP2	0.420				1.580	
	CP3	0.840				1.896	
	CP4	0.788				1.525	

Note: The significance value (***) of all indicators is at the level of 0,001 ($p < 0.001$)

The results of collinearity detection between constructions, the known cut-off is met for all constructions with a VIF value of < 3.3 for all constructs, there is no full collinearity in the model (Kock, 2017). The square root of the AVE and the correlation coefficients among the constructs were used to see the validity of the discriminant (table 2).

Table 2. Discriminant Validity Test Results (Fornell-Larcker)

Latent Variables	AVE	CP	DL	DT	IC
CP	0.576	0.758			
DL	0.697	0.525	0.835		
DT	0.665	0.617	0.663	0.815	
IC	0.687	0.640	0.701	0.654	0.829

Note: In columns DT, IC to CP, the topmost value diagonally indicates the square root value of the AVE.

Referring to the Fornell-Larcker criterion (Hair et al., 2019), the square root value of AVE for discriminant validity with provisions must have a value greater than the correlation of its latent variables. The test results show that the value of the diagonal square root of AVE > the value of the correlation coefficient of other latent variables on the matrix, and the evaluation of discriminant validity is fulfilled.

Table 3. Heterotrait-Monotrait (HTMT) Correlation Test Results

Latent Variables	CP	DL	DT	IC
CP				
DL	0.684			
DT	0.732	0.795		
IC	0.809	0.897	0.792	

Note: Correlation DL, CP; DT, CP; DL, DT; IC, CP; DL, IC; and DTs with IC, each < 0.90.

Heterotrait-Monotrait (HTMT) is an estimate of factor correlation or rather, upper limit (Henseler et al., 2016). The robustness of the HTMT correlation ratio criterion between constructions should be < 0.90 or much less than 1. Test results (table 3) all values less than 0,90 (0,684; 0,732; 0,795; 0,809; 0,897; 0,792 < 0,90; < 1,0) these evaluation results conclude good discriminant validity. In this study, model measurements on constructs were concluded to be reliable and valid.

Model Fit Evaluation
The analysis is carried out by model evaluation, the aim is to determine the predictive power of the proposed model seen from the value of the coefficient of determination (R^2) of endogenous latent construction. DT has an R^2 value of 0,439, IC has an R^2 value of 0,555, and CP has an R^2 value of 0,479 (DT and CP tend to be moderate, while IC is moderate) meaning that the model has moderate predictive power so it can reflect all endogenous constructs (Henseler et al., 2016; Hair et al., 2019: p.18).

Table 4 Model Fit Evaluation Results

Path Relationship	R^2	Adj. R^2	f^2	SRMR	NFI	d_ULS	d_G
DL --> CP			0.021				
DL --> DT	0.439	0.433	0.783				
DL, DT --> IC	0.555	0.546	0.287; 0.144				
DT, IC --> CP	0.479	0.463	0.141; 0.152				

0.090	0.701	0.890	0.360

Note: R^2; f^2, being on the threshold, SRMR; NFI, d_ULS; d_G, the criteria of the fit model.

In addition, f^2 is the ability to explain effects (Huang, 2021), in explaining dependent constructs in structural models (Hair et al., 2019). The magnitude of the effect size seen from the values of f^2 for $H_1 = 0,021$ (weak), $H_2 = 0,782$ (strong), $H_2 = 0,287$ (moderate), $H_4 = 0,144$ (nearing moderate), $H_5 = 0,141$ (nearing moderate), $H_6 = 0,152$ (moderate) are all at the thresholds of 0,02, 0,15, and 0,35, as suggested (Cohen, 1988; Hair et al., 2019). It can be concluded that exogenous variables can explain endogenous variables, with the criterion of explanatory effect values being in the medium category. These results also represent the explanatory effect criteria for mediation effects (H_7, H_8, H_9, and H_{10}).

The Normed Fit Index (NFI) value of 0,735 is lower than the required criteria to be > 0,90, the fit model (Hu & Bentler, 1998). In this study, the evaluation and criteria for using NFI for model fit refer to Hair et al., (2021). NFI has a value range between 0 to 1, the greater the NFI value, the better (Huang, 2021), NFI of 0,701 model fit is achieved. Also obtained a Standardized Root Mean Square Residual (SRMR) value of 0,090 smaller than 0.10 (SRMR = 0,090 < 0,10), model fit can still be achieved (Hu & Bentler, 1998; Henseler et al., 2016). Meanwhile, d_ULS (0,890 = 89%) and d_G (0,360 = 36%) have values lower than the upper limits of 95% and 99% (Narzary, 2022; Alabdali & Salam, 2022), this ensures that the model fits.

Structural Equation Modeling Analysis

The bootstrapping procedure is performed to measure the indirect effects of the mediation role, as recommended by Hair et al., (2011). Meanwhile, the PLS-SEM path analysis model for parameter estimation of direct effects is presented in Table 5.

Table 5. Parameter Estimates of Direct Effects, Path Analysis Verification

Hypothesis	Path Relationship	OS	Path Coefficient	T-Statistics	p-value	Results
H1	DL --→ CP	0.212	0.212	2.011*	0.029	Accepted
H2	DL --→ DT	0.663	0.663	12.452***	0.000	Accepted
H3	DL --→ IC	0.477	0.477	5.132***	0.000	Accepted
H4	DT --→ CP	0.343	0.343	3.401**	0.001	Accepted
H5	DT --→ IC	0.337	0.337	3.099**	0.002	Accepted
H6	IC --→ CP	0.408	0.408	3.863***	0.000	Accepted

Note: OS, original sample; path coefficient (β), the parameter of direct effect; *significant at $p < 0.05$; ** significant at $p < 0.01$; *** significant at $p < 0.001$.

The verification results of direct path analysis show that all original sample values are –
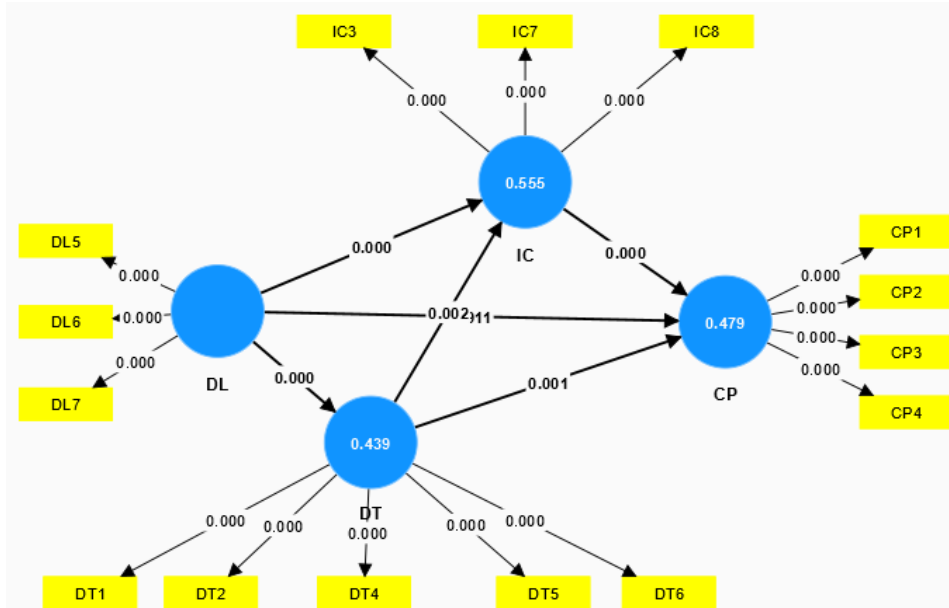

Figure 3. Structural model of bootstrapping procedure

positive, meaning DL and CP, DL and DT, DL and IC; DT and CP, DT and IC; also IC and CP have a unidirectional relationship. The findings also showed that DT and CP were directly positively correlated ($\beta = 0,212$), and significantly at p-value = 0,029 (t stat > 1,96), so H_1 proved acceptable. While other findings showed a positive correlation between DT and IC of $\beta = 0,663$ and significant at p-value = 0,000 (t stat > 1,96), H_2 proved acceptable. DL and IC have a positive correlation with a value of $\beta = 0,477$ and significant at p-value = 0,000 (t stat > 1,96), H_3 proved acceptable. DT and CP had a positive correlation with $\beta = 0,343$ and significant at p-value = 0,001 (t stat > 1,96), H_4 proved acceptable. DT and IC have a positive correlation of $\beta = 0,337$ and significantly at p-value = 0,002 (t stat > 1,96), H_5 proved acceptable. Path analysis also found IC with CP to have a positive correlation with $\beta = 0,408$ and significant at p-value = 0,000 (t stat = 3,863 > 1,96), H_6 proved acceptable. The results of verification and parameter estimation of the direct effects conclude all accepted hypotheses.

Mediation Role Analysis
Detection of influence from the role of intermediaries can be seen from the t value of indirect influence (Huang, 2021). A comparison of the value of 1,96 with the statistical t was carried out, the stat value > 1,96 showed there was a mediation effect. To determine the magnitude (partial or full) of the mediating effect on some relevant literature, the variance of VAF values with VAF value criteria VAF >20% or VAF value >80%, as prescribed by (Hair et al., 2012; Huang, 2021). In this study, structurally, the strength of the effect size of the mediation role was obtained from the upsilon statistic $(v) = \beta^2_{YM.X} - (R^2_{Y.MX} - \rho^2_{YX})$ as recommended and developed by Lachowicz et al., (2018); and Ogbeibu et al., (2021), then $v = \beta^2_{IC.DL}\beta2_{IC.DT}\beta2_{CP.IC.DL.DT}$.

Table 6. Estimates of Indirect Effect, Verification of Mediation Path Analysis

Hypothesis	Path Relationship	IDE	TE	T Statistics	p-value	VAF	Results

H7	DL $\dashrightarrow$ DT $\dashrightarrow$ CP	0.227	0.890	3.113**	0.002	0.2551	Accepted
H8	DL $\dashrightarrow$ IC $\dashrightarrow$ CP	0.195	0.672	3.062**	0.002	0.2902	Accepted
H9	DT $\dashrightarrow$ IC $\dashrightarrow$ CP	0.138	0.475	2.376*	0.018	0.2905	Accepted
H10	DL $\dashrightarrow$ DT $\dashrightarrow$ IC $\dashrightarrow$ CP	0.091	0.811	2.137*	0.025	0.1123	Accepted

Note: IDE, indirect effect; TE, total effect; * significant at $p < 0.05$; ** significant at $p < 0.01$.

The role of digital transformation (DT) in mediating the influence of digital literacy (DL) on competitiveness (CP), where indirect effects (IDE) are seen from the VAF value of 0,2551 (> 20%, but < 80%), the range shows partial/moderate mediation effects (Hair et al., 2012; Huang, 2021). Consistent results were found, when viewed from the size of the IDE obtained by 0.227, the effect of mediation was in the moderate range. It can be concluded that H_7 proved to be acceptable, digital transformation (DT) had a mediating effect on the effect of digital literacy (DL) on competitiveness (CP) and was significant at p-value = 0,002 (t stat = 3,113 > 1,96).

Innovation capability (IC) also has a mediating effect on the effect of digital literacy (DL) on competitiveness (CP), where the indirect effects (IDE) seen from the VAF value of 0,2901 (> 20%, but < 80%), the range shows a partial/moderate mediation effect (Hair et al., 2012; Huang, 2021). Similarly, when viewed from the size of the IDE obtained at 0,195, the effect of low mediation is towards the moderate range. It can be concluded that H_8 proved to be acceptable, innovation capability (IC) has a mediating effect on the effect of digital literacy (DL) on competitiveness (CP), and significant at p-value = 0,002 (t stat = 3,062 > 1,96).

The role of innovation capability (IC) also has a mediating effect on the effect of digital transformation (DT) on competitiveness (CP), where the indirect effects (IDE) are seen from the VAF value of 0,2905 (> 20%, but < 80%), the range shows a partial/moderate mediation effect (Hair et al., 2012; Huang, 2021). Consistent with these results, judging from the size of the IDE obtained at 0,138, the effect of mediation is low towards the moderate range. It can be concluded that H_9 proved to be acceptable, innovation capability (IC) has a mediating effect on the effect of digital transformation (DT) on competitiveness (CP), and significant at p-value = 0,018 (t stat = 2,376 > 1,96).

In addition, the findings also show that digital transformation (DT) and innovation capability (IC) mediating the influence of digital literacy (DL) on competitiveness (CP) were found, where indirect effects (IDE) seen from the VAF value of 0,1123 (< 20%), the range shows a mediating effect in the low range to moderate effect (Hair et al., 2012; Huang, 2021). Consistent with these results, judging from the size of the IDE obtained at 0,091, the effect of mediation is low towards the range of moderate effects. It can be concluded that H_{10} proved to be acceptable, digital transformation (DT) and innovation capability (IC) serially had a mediating effect on the effect of digital literacy (DL) on competitiveness (CP) and was significant at p-value = 0,025 (t stat = 2,137 > 1,96). All mediation roles in the model constructed by this study have a moderate mediation effect, the proposed SME competitiveness improvement model has a good model match so that it can bridge the existing gap.

DISCUSSION

Digital literacy (DL) correlates with digital transformation (DL), innovation capability (IC), and competitiveness (CP), as well as D L with IC and CP, as well as IC with CP. Where the direction of all relationships is ensured to be positive. Today's digital knowledge and skills are so needed to support business models and processes that increasingly disrupt traditional ways, think critically following economic goals, have increased awareness of the importance of digital literacy to be able to access various information, issues, and challenges, and problems of the digital economy even to identify and find out opportunities for digital market expansion can encourage the courage of digital adoption in business processes and the emerging ability to carry out digital transformation is possible. The role of digital literacy is needed by MSME actors, even for people in digital transformation. The courage and ability to carry out digital transformation among SMEs can potentially be followed by their innovation and competitiveness capabilities because there are demands for adaptation in digital platforms that require fast movement and service. The adequacy of digital literacy in digital transformation practices supported by the ability to innovate is one of the relatively new approaches that need to be carried out gradually based on the flow of change from time to time so that the business world remains able to compete in a tight and dynamic market competition.

Research findings show that digital literacy directly has a significant positive effect on competitiveness (H_1). This finding is in line with the findings of Ali Qalati et al., (2020), that digital literacy plays an effective role in increasing the competitiveness of SMEs. Rozak et al., (2021); Firmansyah & Saepuloh (2022), also found that digital literacy has a positive impact on increasing the competitiveness of SMEs in business processes in the digital economy era. Meanwhile, RVSPK et al., (2020), their research findings show that the digital literacy (DL) dimension has a negative impact on business uncertainty, but has a positive effect on the competitiveness (CP) of SME business actors. It can be recognized that DL greatly influences the economic competitiveness of SMEs and can minimize business uncertainty in the modern era which is thick with advances in digital technology.

Digital literacy has a significant positive effect on digital transformation (H_2). Digital literacy on digital transformation has a greater influence than the direct influence on competitiveness, even on innovation capabilities. This finding follows Peter et al., (2020), that the conceptualization of digital transformation is based on a common understanding, shows that the influential drivers of digital transformation are process engineering, new technology, digital literacy, and digital business development, supported by leadership and culture, cloud and data, customer centricity and digital marketing. Advances in digital technology and adequate digital literacy of human resources of economic actors have influenced digital transformation practices, the reason being the importance of digital services and systems for social development today (e.g., Pelletier & Cloutier, 2019; Morze & Strutynska, 2021; Fechtelpeter et al., 2017). The speed of digital transformation is indeed largely determined by consumer needs and movements, but digital literacy is the starting point for encouraging business actors to be able to upgrade into the digital space for unlimited business acceleration.

The findings also show that digital literacy has a significant positive effect on innovation capabilities (H_3). This finding is reinforced by the findings of Wang et al., (2021), the increase in digital literacy can optimize the digital production environment, digital innovation environment, and educational environment, namely the digital-business environment, which is beneficial for the formation of a fair, balanced, healthy, innovative and sustainable development

environment for the digital economy. Digital literacy readiness affects the innovation capabilities of SMEs (e.g., Shin & Kang, 2021; Anshari & Almunawar, 2022). Therefore, wisely at the empirical level, it is worthy of recognition that there is a beneficial relationship between digital literacy and innovation capabilities for SMEs to survive and thrive in a continuously renewable era. Such conditions emphasize that digital literacy has a fundamental role in optimizing do-digital business.

Research findings show that digital transformation directly has a significant positive effect on competitiveness (H_4). This finding is in line with the results of Firmansyah & Saepuloh's (2022) research, the exploitation and integration of digital technology often affect most companies at various scales and even beyond their limits, by affecting products, business processes, sales channels, and supply chains to be able to create sustainable competitive advantages. The use and alignment of digital technology in an enterprise, making organizational change, enabling activities, and creating and capturing new opportunities and value (Jeansson & Bredmar, 2019; Firmansyah & Saepuloh, 2022a). In today's renewable economy era, the focus of businesses and their personnel from actively competing industries around the world exerts pressure to go digital before anyone else does, striving to survive and achieve a competitive advantage (Morze & Strutynska, 2021; Bharadwaj, 2000; Reis et al., 2018).

The findings also show that digital transformation has a significant positive effect on innovation capability (H_5). The practice of digital transformation as part of the ability to adapt to high concepts can simultaneously create innovation capabilities to answer company-specific demands which is a key factor to support SMEs to take advantage of technological opportunities related to the digitization process. These findings are in line with (Fechtelpeter et al., 2017; Firmansyah & Saepuloh, 2022a; Zaoui & Souissi, 2020; Wahdiniwaty et al., 2022).

Predictions of innovation capability were found to have a significant positive effect on competitiveness (H_6). The ability to innovate can strengthen the economic competitiveness of economic actors. Innovation arises because of creativity which includes creative aspects of personality, motivation, intelligence, thinking style, and relevant multiliteracy. Creativity and continuous innovation ability as the keys to success for business in the modern era. This finding is in line with the research of Mcmullan & Kenworthy (2016); and Darroch & Mazerolle (2013), this confirms that relevant business innovation practices are needed in this era to improve entrepreneurial performance with better competitiveness (Firmansyah, Wahdiniwaty, et al., 2023).

Meanwhile, the mediation path in the constructed model all have a moderate mediation effect, and the model fit criteria are met. Where the findings show that digital transformation has a mediating effect on the influence of digital literacy on competitiveness (H_7). Innovation capabilities have a mediating effect on the effect of digital literacy on competitiveness (H_8). It was also found that innovation capabilities have a mediating effect on the effect of digital transformation on competitiveness (H_9). The mediating effect of innovation capability on the effect of digital transformation on competitiveness is lower than the mediating effect of digital transformation on the effect of digital literacy on competitiveness, even lower than the mediating effect of innovation capability on the influence of digital literacy on competitiveness. However, all three mediating roles are in the range of moderate mediation effects. This finding is reinforced by the results of research by Darroch & Mazerolle, (2013); Firmansyah, Mulyadi,

et al., (2023); Zhang et al., (2022); Firmansyah & Saepuloh (2022a); and Krumsvik (2015). This digital transformation and innovation capability strengthens the link between digital literacy and competitiveness. To identify and recognize opportunities for digital market expansion, digital readiness and courage for digital adoption in business processes are needed for MSME players. This condition further intervenes in the importance of digital literacy to improve the ability of SMEs to carry out business digital transformation as a form of business model and process innovation to find and create new ones, and will again increase innovation thinking and capabilities that are relevant to the demands and developments of the renewable economy in the current digital economy era, to improve the performance of SMEs and strengthen the competitiveness of micro and small enterprises directly or indirectly on an ongoing basis. Therefore, our research findings consider the importance of deep understanding and communication with online customers, adequate digital literacy will accelerate the introduction of digital technology in the modern economic era, business model transformation practices in the online space and implementing a consistent innovation culture can potentially affect the ability to create competitive advantages.

The findings from mediation path analysis also show that digital transformation and serial innovation capabilities have a mediating effect on the effect of digital literacy on daylight power (H_{10}), the effect of serial mediation is on moderate criteria. Technology and environmental factors have demanded that entities have digitally talented HR capacity, critical mindset, and multiliteracy to drive digital transformation practices that have a positive impact on the organization's ability to create innovation capabilities for its competitiveness, multiliteracy plays an important role in technology adoption and environmental adaptation for successful digital transformation (Zhang et al., 2022; Firmansyah, 2022a). The digital transformation process explains the importance of digital literacy and multiliteracy to support the innovation process to strengthen competitiveness (Firmansyah & Saepuloh, 2022; Firmansyah, Wahdiniwaty, et al., 2023). Therefore, to improve the ability of successful digital transformation of MSMEs, able to create innovative thinking and capabilities so that they have an impact on the competitiveness of sustainable MSMEs, it is better to start by paying attention to the readiness of digital literacy of human resources of MSME actors.

The economic competitiveness of SMEs constructed in the model proposed by the research has a good model fit by relying on predictions and theory development. Where overall the role of mediation in the model has a moderate mediation effect, to cover the existing gaps, but still we are subject to limitations. The findings of this study conclude that digital transformation and serial innovation capabilities have been shown to have a mediating effect on the effect of digital literacy on daylight. Digital literacy of human resources is a set of core competencies that must be mastered properly to ensure the success of digital transformation practices to increase innovation capabilities towards achieving sustainable MSME competitiveness stability. Digital transformation and innovation capabilities as important factors that can contribute to the achievement of sustainable MSME competitiveness improvement in the digital economy era.

CONCLUSION
The results of the model measurement showed that reliability with good consistency, and the correlation coefficient between constructs for validity were met, judging from criteria $C\alpha$, HTMT, and AVE also found no indication of collinearity (VIF) for all constructs. The results of the evaluation of model suitability, it is known that the value of R^2 for the construct of each

latent variable is in the medium category, as well as for the size of the effect f^2 all values are at the threshold, the criteria for the explanatory effect value are in the medium category. In addition, evaluation results based on SRMR, NFI, d_ULS, and d_G show model fit is achieved and ensures model fit.

Findings from the results of structural model path analysis show that: digital literacy directly has a significant positive effect on competitiveness (H_1 is proven to be acceptable). Digital literacy has a significant positive influence on digital transformation (H_2 is proven to be acceptable). Digital literacy has a significant positive influence on innovation capabilities (H_3 is proven to be acceptable). Digital transformation has a significant positive influence on competitiveness (H_4 is proven to be accepted). Digital transformation has a significant positive influence on innovation capabilities (H_5 is proven to be accepted). Innovation capabilities have a significant positive influence on competitiveness (H_6 is proven to be acceptable). Meanwhile, findings from the analysis of indirect influence pathways show: that digital transformation has a mediating effect on the effect of digital literacy on daylight power (H_7 proved acceptable). Innovation capabilities have a mediating effect on the effect of digital literacy on daylight power (H_8 proved acceptable). Innovation capabilities have a mediating effect on the effect of digital transformation on daylight power (H_9 proves acceptable). The results of the analysis also found that digital transformation and serial innovation capabilities have a mediating effect on the effect of digital literacy on competitiveness (H_{10} proved acceptable). Therefore, the novelty findings of this research produce a model of the economic competitiveness of SMEs in the digital economy era.

The contribution of this research is empirically proven that digital transformation and innovation capabilities strengthen the influence of digital literacy on the economic competitiveness of MSMEs in hand-made creative industries (handicrafts, souvenirs, fashion, snacks, and the like) even though they are located in areas, coastal or even urban areas. This potential can be explored and developed along with the shift to traditional, face-to-face business practices that rely on visitors who come to digital practices along with the emergence of various digital platforms as a place to market products (marketplace) digitally or a combination of both. In addition to the vision, and mission to achieve business goals through various strategies chosen to be implemented at the SME level, business digital transformation practices must be strengthened by adequate digital literacy to contribute to increasing innovation capabilities and adaptability which are strategic and relevant approaches in this era to survive and develop with better business competitiveness. This is also expected to broaden horizons on the effectiveness of highly competitive businesses in this era, where digital literacy, digital competence of human resources, and digital transformation capabilities are prepared, and innovation capabilities must be improved.

This research recognizes and is subject to limitations, which are inseparable from the approach, gap synthesis, and understanding of the latest conditions of digitalization of MSMEs, including from the aspect of methodological rigor applied, this research has several limitations that need to be considered when interpreting the findings and conducting further relevant research. The constraints and success factors of digital transformation among MSMEs to increase competitiveness are not only digital literacy, digital transformation practices, and innovation capabilities that affect it but relevant multiliteracy that is potentially needed by individuals and business actors in the digital economy era, such as skills, readiness, competencies and digital

skills (digital literacy), social capital, digital talent, talent management, digital-based business training also needs attention is paid to strengthen economic competitiveness and ensure the accuracy of predictions of sustainable business success. In addition, from a methodological aspect using a combination of other research methods, it is possible to identify and assess digital size and maturity.

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