

TECHNOLOGICAL FACTORS AND SOCIAL MEDIA ADOPTION AMONG MICRO-ENTERPRISES: THE MODERATING ROLE OF PERSONAL INNOVATIVENESS

Hendrick Hernando*¹ 

Sobia Shahzad²

Niza Nurmalasari³

^{1,3} Department of Business Administration, Politeknik Negeri Madiun, Indonesia

² Department of Mass Communication, Government College University Faisalabad, Pakistan

Email: hernando@pnm.ac.id¹; sobiashahzad@gcuf.edu.pk²; niza.nurmalasari@pnm.ac.id³

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***Correspondence:**

Name: Hendrick

Hernando

E-mail:

hernando@pnm.ac.id

ABSTRACT

Introduction: Adopting social media has many benefits for micro-enterprises, particularly in terms of greater marketing exposure. Thus, identification of social media adoption and the associated determinants is essential. This study sets a moderating variable to fill the identified gap in previous studies. Besides, the influence of technological factors as social media adoption determinants is evaluated.

Methods: Employing a purposive sampling procedure, data were obtained via questionnaires distributed to owners or managers of micro-enterprises in Madiun. A total of 120 valid responses were analyzed using partial least squares structural equation modeling (PLS-SEM).

Results: The results of this study showed that cost-effectiveness and perceived compatibility positively affect the adoption of social media apps, while relative advantage has no significant influence. Our findings also found that personal innovativeness significantly moderates the relationship between relative advantage and social media adoption.

Conclusion and suggestion: As a novel contribution, this study has confirmed the moderating role of personal innovativeness, while some advice for stakeholders, including government and platform developers, is provided.

INTRODUCTION

The presence of social media in daily life has reformed communication processes, both in individual and business purposes ([Cartwright et al., 2021](#)). It offers numerous benefits for business operations, including cost-effective marketing, increasing customer engagement, and brand building. In terms of marketing activities, social media tends to increase market enthusiasm through a growing number of website visitors ([Dolega et al.,](#)

2021). Besides, social media provides a platform for customers to share their opinions, suggestions, and feedback related to the offered product and service. Social media also facilitates business owners in building their own brand through several methods, such as product content, influencer partnerships, and filtered advertising (Fowler & Thomas, 2023; Ullah et al., 2023). Based on a merger of user databases and analytics capabilities, social media has become an impressive tool for conducting highly suitable advertising. This establishes social media as an optimal channel of marketing and communication for micro, small, and medium-sized enterprises (MSMEs), given their inadequate business resources (Amoah & Jibril, 2021).

According to National Law Number 20 of 2008, there are three classifications of MSMEs in Indonesia, and micro-enterprises are one of them. This classification refers to a business owned by an individual and/or an individual business entity with a maximum annual earnings of IDR 300 million. Further, the Indonesian Agency of Statistics has categorized micro-enterprises as business units with a maximum of five workers (Tambunan, 2021). Based on information from the Indonesian Chamber of Commerce and Industry, as of 2023, the population of MSMEs has reached 66 million, and more than 97% have been identified as micro-enterprises. MSMEs have become the backbone of the national economy given their major contribution to gross domestic product and workforce absorption (Anatan & Nur, 2023). However, due to their limited resources, MSMEs are still struggling to expand their current markets and innovate products. Moreover, micro-enterprises are constrained by a low level of technological proficiency and the availability of funds, especially for marketing channel investment (Ali Abbasi et al., 2022).

Social media adoption in micro-enterprises has increased during the COVID-19 pandemic, which transformed the daily transaction process into a contactless mode. The restriction of physical interaction, as a primary impact of the COVID-19 pandemic, has forced micro-enterprises to utilize social media as an important marketing channel (Yu et al., 2022). In this situation, adopting recent technology, such as social media, is highly important to outperform other micro-enterprises (Kaniawati et al., 2024). The current emergence of social media also reforms business practices, particularly in the marketing process, and helps micro-enterprises obtain a competitive advantage. Related to the limitations of micro-enterprises, social media can accommodate marketing activities, including promotion, advertising, and product evaluation, in a cost-effective way. Further, the use of social media, such as Instagram, Facebook, and WhatsApp, increases the possibility of reaching new potential customers. In contrast to established companies that handle social media within their specialist employee or external advisor, social media in micro-enterprises is managed directly by the business owner (Cvjetkovic, 2023). Thereby,

the success of social media adoption in such situations is greatly determined by the business owner's proficiency in terms of using new technologies.

Prior studies of social media adoption have used various behavioral frameworks, such as the technology acceptance model (TAM), the unified theory of acceptance and use of technology (UTAUT), and the technology-organization-environment (TOE). For instance, an empirical study by [Salam et al. \(2021\)](#) has explored social media adoption among SME retailers in Pakistan using TAM. Another study has employed UTAUT to describe the social media adoption process within Indonesian MSMEs ([Pranoto & Lumbantobing, 2021](#)). Further, other related studies have used TOE ([Ali Abbasi et al., 2022](#); [Amegbe et al., 2023](#); [Amoah et al., 2023](#); [Cvjetkovic, 2023](#); [Effendi et al., 2020](#); [Fu et al., 2024](#); [Qalati et al., 2021, 2022](#); [Sugandini et al., 2022](#)), and this framework is relatively more popular in the context of micro-enterprises. As a comprehensive framework, TOE is seen as having greater explanatory power since it involves organizational and environmental factors ([Qalati et al., 2021](#)). This framework can be applied to a broad range of technologies and organizational classes, making it a useful approach for scholars in various disciplines.

Although the TOE framework views an innovation process, such as social media adoption, within a holistic picture that involves more factors, criticism of this framework still emerged due to inconsistent findings. In the MSMEs context, the relationship between technological factors and social media adoption has contributed to those inconsistent findings. While previous studies have proven a significant influence of technological factors on social media adoption ([Amegbe et al., 2023](#); [Cvjetkovic, 2023](#); [Effendi et al., 2020](#); [Qalati et al., 2021](#); [Qalati et al., 2022](#); [Sugandini et al., 2022](#)), some studies have provided different outcomes. For instance, an empirical study of 508 Indonesian SMEs found no significant influence of technological factors on social media adoption ([Fu et al., 2024](#)). Another case also failed to prove the role of technological factors in gaining social media adoption among 430 SMEs in Ghana ([Amoah et al., 2023](#)). Furthermore, a study involving 332 SMEs in Palestina also generated no significant impact of technological factors ([Alkhateeb & Abdalla, 2021](#)). Therefore, further extensions within this conceptual relationship are needed to be examined empirically.

Based on the identified research gap, the present study aims to investigate the moderating role of personal innovativeness in the relationship between technological factors and social media adoption. Personal innovativeness is important to consider, given the common condition of micro-enterprises that are directly managed by their owners ([Letonja et al., 2021](#)). Furthermore, the moderating variable in the relationship between technological factors and social media adoption in the micro-enterprises context remains unexplored. Prior studies tend to focus on the direct impact of TOE-related factors as social media adoption determinants ([Amoah et al., 2023](#); [Fu et al., 2024](#)). This study delivers a new insight to encourage further exploration, particularly in evaluating other

moderating variables. The findings will enable MSMEs policymakers to gain a comprehensive understanding and consequently formulate suitable policies. Hence, this study not only contributes to academic enrichment but also provides an effective mindset for resolving problems that MSMEs face in adopting social media. The rest of this paper consists of several parts, such as the theoretical framework, research method, analysis and discussion, and conclusion.

LITERATURE REVIEW

Technology-Organization-Environment (TOE) Framework

The process of how organizations adapt to innovations and new technologies has attracted many scholars, especially in the information systems field. As noted in [Pateli et al. \(2020\)](#), innovation refers to an object, process, or concept that is new to others and comprises both adoption and implementation. For understanding and explaining the adoption process of specific innovations, several frameworks have been posited, such as the diffusion of innovations (DOI) in 1962, the theory of planned behavior (TPB) in 1991, the unified theory of acceptance and use of technology (UTAUT) in 2003, etc. Digital technologies, such as social media, are applied through two prominent frameworks, namely the technology acceptance model (TAM) and the technology-organization-environment (TOE). TAM, introduced in 1986, emphasizes technology adoption at the individual level. On the other hand, TOE explores how organizations adopt novel technologies ([Ganguly, 2024; Zhong & Moon, 2023](#)). The adoption process within an organization may occur at different scopes, such as the small team, the business division, or the whole organizational unit ([Pateli et al., 2020](#)). A new technology needs to be adopted into an organization's work processes due to performance improvement reasons.

[Tornatzky et al. \(1990\)](#) argued that the adoption of new technology is impacted by three leading components, namely technological, organizational, and environmental factors ([Amoah et al., 2023](#)). The conception has been recognized as TOE, where the technological, organizational, and environmental aspects contribute to how technological advancements are adopted. In terms of micro-enterprises, [Wulandari et al. \(2020\)](#) reported that TOE has successfully explained the adoption of new technology, such as social media. Then, technological factors refer to internal and external technological characteristics that are significant for the adoption process ([Cvjetkovic, 2023](#)). Scholars have explored several technological factors related to social media adoption in the micro-enterprises setting, including relative advantage, cost effectiveness, and also perceived compatibility ([Amoah et al., 2023; Qalati et al., 2021](#)). To successfully adopt social media, both internal and external capabilities should be considered, especially with regard to

technological factors. Further, technological factors also describe the benefits of adopting such particular technologies within the organization before they are implemented.

Social Media Adoption

The term social media refers to tools that support communication and interaction through the use of discussion forums, comments, and the sharing of information among each other (Malita, 2011). Through social media applications, users are able to collaborate on digital content, utilizing mobile and web-based platforms (Ho & Wang, 2020). Business owners can extend their traditional marketing practices through social media, which provides more attractive marketing possibilities. Therefore, the adoption of social media has become essential for businesses today, allowing them to understand and interact with their customers expediently (Mataruka & Muzurura, 2023). In the MSMEs context, scholars have reported several benefits when business owners or administrators take advantage of operating social media. Amegbe et al. (2023) explained that social media usage can provide benefits such as efficient information sharing and customer relationship development. Furthermore, micro-enterprises may find it beneficial to engage with their customers through social media during crises in order to survive. Past empirical literature shows that social media adoption by MSMEs has a tremendous impact on business performance (Fan et al., 2021; Qalati et al., 2022).

Relative Advantage

An individual's perceived relative advantage may determine the adoption process of a new technology, including social media applications. Business owners, as decision-makers in MSMEs, will be more likely to advocate such novel technology if they perceive that its adoption will provide benefits (Ali Abbasi et al., 2022). In the context of micro-enterprises, social media usage provides benefits in terms of greater communication and audience reach (Cvjetkovic, 2023). Likewise, the adoption of social media is important in other related functions such as product development and sales operations (Fan et al., 2021). Previous works have established that social media adoption within micro-enterprises is driven by the perceived relative advantage that it provides to business activities. An empirical study by Qalati et al. (2021) evidenced the significant influence of relative advantage on social media adoption among SMEs in Pakistan. Other studies also demonstrated the same results of the significant influence in the micro-enterprises setting (Ali Abbasi et al., 2022; Mataruka & Muzurura, 2023). Hence, the formulation of the first hypothesis is as follows:

H1: Relative advantage positively influences social media adoption

Cost-Effectiveness

The second concern for technology adoption within an organization, including MSMEs, is cost-effectiveness. Organizations can engage with their end consumers on

social media at a low cost and in a timely manner (Qalati et al., 2021). Social media allows customers to express their experiences with any product or service, and it will cultivate the trust of other potential customers at a minimal cost. Due to a lack of funds, technology adoption costs are a critical determinant in the context of MSMEs (Qalati et al., 2022). Several studies have identified the important role of cost-effectiveness in social media adoption within micro-enterprises. For example, Amoah et al. (2023) studied a sample of 430 Ghanaian SMEs and found a significant impact of perceived cost on social media adoption. Qalati et al. (2022) conducted research among Pakistani SMEs owners, which highlighted a significant influence of cost-effectiveness on social media adoption. Moreover, Pranoto and Lumbantobing (2021) also confirmed that SMEs are likely to adopt social media when they perceive the related costs to be acceptable. According to the above explanation, a hypothesis is formulated as follows:

H2: Cost-effectiveness positively influences social media adoption

Perceived Compatibility

Introducing a new technological innovation without following a firm's cultural and social norms can hinder its adoption and use (Ali Abbasi et al., 2022; Yoon et al., 2020). Hence, adopting recent technology, such as social media, is challenging due to the incompatibility between existing conditions and technological requirements. A high level of compatibility means that the adoption of such new technology requires little or no training and experience (Eze et al., 2021). Prior studies have proved that perceived compatibility led to decisions on social media adoption within the MSMEs context. For instance, Effendi et al. (2020) observed 250 SMEs in Indonesia and validated the significant role of perceived compatibility in social media adoption. Qalati et al. (2022) also reported the significant influence of compatibility on social media adoption among Pakistani SMEs. In line with the above studies, empirical evidence obtained by Eze et al. (2021) shows a similar result of significant influence. Thus, the formulation of the third hypothesis in this study is as follows:

H3: Perceived compatibility positively influences social media adoption

Personal Innovativeness

In technology adoption studies, such as e-wallets, e-commerce, and other apps, moderating factors are commonly involved (Senali et al., 2023). Requiring the moderating variable in the research model would increase complexity and provide a comprehensive explanation of how a person decides whether to adopt technology. According to the inconsistent findings in the past research, the moderating variable might be considered in recent study and several studies have obtained contradictory findings about the influence

of technological factors on social media adoption within the context of micro-enterprises (Amoah et al., 2023; Fu et al., 2024).

Research has elucidated that the use of emerging technology depends on personal innovativeness (Alkawsu et al., 2021). In this context, personal innovativeness may act as a moderating variable among the factors that form the intention to adopt a particular technology. In more detail, Agarwal and Prasad have formulated the measurement of personal innovativeness in information technology (PIIT) and set it as a moderating variable (Grandon & Ramirez-Correa, 2018). Furthermore, they postulated that PIIT has a moderating impact on the determinants of individual perception toward new information technology. The concept of personal innovativeness is aligned with the nature of micro-enterprises, which are mostly directly managed by the owners (Letonja et al., 2021). Higher levels of innovativeness will encourage people to take risks and adapt to new technologies (Senali et al., 2023). However, positive perceptions of risk and uncertainty will make the determinants of new technology adoption less impactful (Matute-Vallejo & Melero-Polo, 2019; Yen, 2023). Thus, several hypotheses are proposed as follows:

- H4(a):** Personal innovativeness negatively moderates the influence of relative advantage on social media adoption
- H4(b):** Personal innovativeness negatively moderates the influence of cost-effectiveness on social media adoption
- H4(c):** Personal innovativeness negatively moderates the influence of perceived compatibility on social media adoption

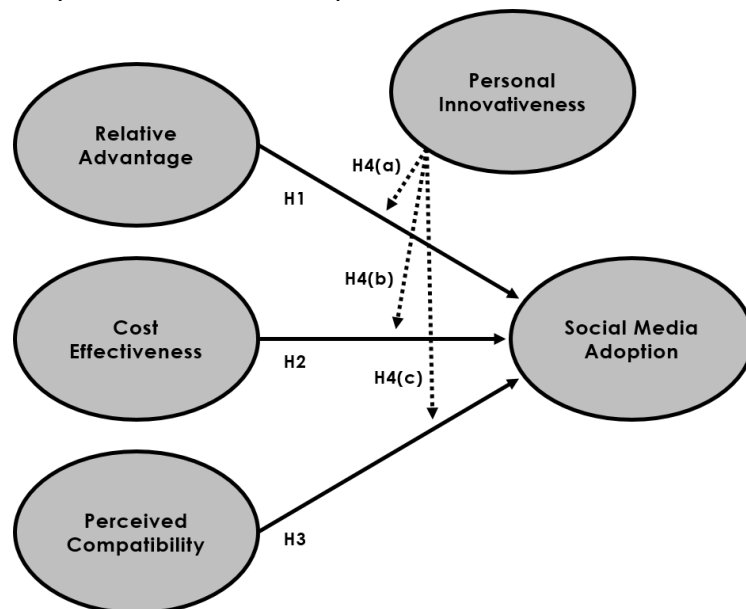


Figure 1. Conceptual framework

Figure 1 illustrates a comprehensive and formulated conceptual framework for this study, presenting the interplay between technological factors, personal innovativeness,

and social media adoption. According to this framework, several research hypotheses and subsequent analyses were elucidated in this study.

RESEARCH METHODS

Research Design

Taking a quantitative approach, a survey method was employed to examine the formulated hypotheses. The survey process was executed using a closed-ended online questionnaire involving owners and managers of micro-enterprises in Madiun, Indonesia. This study utilized the purposive sampling method due to the unidentified number of micro-enterprises in Madiun. As explained by Taherdoost (2016), purposive sampling refers to a process to collect valuable information in a pre-determined particular setting. Specifically, the sample characteristics in this study refer to owners or managers of an individual-owned business with a maximum annual income of IDR 300 million. In addition, they must have employed social media apps for business purposes, at least for the past three months. The data collection process in this study began in May 2024 and lasted for six weeks. As a result, 120 responses to the questionnaire were obtained for further analysis. The total number of respondents has fulfilled the minimum sample size by employing the "ten times rule" (Richter et al., 2016). Meanwhile, to achieve the research objectives, partial least squares structural equation modeling (abbreviated as PLS-SEM) was utilized in the data analysis process. PLS-SEM, classified as a multivariate-based technique, is suitable for exploratory studies (Hair et al., 2019; Sarstedt et al., 2022). Basically, PLS-SEM consists of two measurement stages, including the reflective model measurement and the structural model measurement.

Measurement Scale

The measurement items in our study were adopted from prior related studies, especially in the context of MSMEs. Social media adoption refers to the utilization of social media platforms for business reasons, including information-sharing and communication activities (Amoah et al., 2023). Three indicators were applied to measure social media adoption, such as product promotion, business communication, and customer feedback (Amoah et al., 2023; Fan et al., 2021). Relative advantage is defined as the range to which social media provides greater benefits in comparison to other available alternatives (Cvjetkovic, 2023). Three indicators were employed for measuring relative advantage, namely product marketing, customer relationship management, and market intelligence (Ali Abbasi et al., 2022; Amoah et al., 2023). Further, cost-effectiveness is described as the degree to which social media is more beneficial relative to its cost (Qalati et al., 2021). This study applied two indicators for measuring cost-effectiveness, i.e., cost reduction and cost comparison (Amoah et al., 2023; Qalati et al., 2021). Personal innovativeness refers

to the degree to which a business owner or manager employs new things relatively early compared to others in a social environment (Letonja et al., 2021). Two indicators were used for measuring personal innovativeness (Alkawsu et al., 2021; Senali et al., 2023). All measurement items in our study were delivered based on a 10-point Likert scale. Table 2 provides data related to the reliability and validity of each measurement item.

Table 1. Respondents' profile

Profile	Description	Frequency	Percentage
Gender	Male	77	64.17
	Female	43	35.83
Position	Owner	71	59.17
	Manager	49	40.83
Age	Below 26	10	8.33
	26 - 35	43	35.83
	36 - 45	29	24.17
	Above 45	38	31.67
Business Category	Grocery	34	28.33
	Culinary	49	40.83
	Laundry	21	17.50
	Clothing	16	13.33
Platform Used	Instagram	50	41.67
	WhatsApp	56	46.67
	TikTok	14	11.67

Source: Processed data (2024)

RESULT AND ANALYSIS

Respondents' Profile

The questionnaire was directed to approximately 176 micro-enterprises in Madiun with a detailed initial explanation. At the end of the distribution term, 120 valid responses were received, with a 68.18% response rate. Table 1 summarizes the demographic profile of respondents in this study, where 64.17% were male and 35.83% were female. The majority of respondents were categorized as business owners (59.17%), and the rest were business managers (40.83%). Moreover, most of our respondents were between 26 and 35 years old (35.83%). Regarding the category of business, most were categorized in the culinary business (40.83%). When asked about the most used platform, 46.67% of the respondents used WhatsApp, followed by Instagram (41.67%) and TikTok (11.67%).

Table 2. Reflective model assessment results

Construct (Indicator)	Oater Loadings	Cronbach's Alpha	Composite Reliability
Social Media Adoption (SMA)		0.780	0.872
▪ Our business uses social media to promote products	0.856		
▪ Our business communicates with customers through social media	0.778		
▪ Our business uses social media to receive customers' feedback	0.863		
Relative Advantage (RA)		0.837	0.896
▪ Social media would enable our business to market our products in a better way	0.793		
▪ Social media would enable our business to develop better relationships with customers	0.916		
▪ Social media allows us to learn more about business competitors	0.872		
Cost Effectiveness (CE)		0.708	0.873
▪ Social media reduces the cost of marketing communications	0.878		
▪ Social media is more cost-effective for us than traditional media	0.882		
Perceived Compatibility (PC)		0.714	0.839
▪ Our business value is compatible with social media usage	0.797		
▪ Our business process is compatible with social media usage	0.769		
▪ Our business infrastructure is compatible with social media usage	0.822		
Personal Innovativeness (PI)		0.814	0.909
▪ I would not hesitate to try out new information technology	0.865		
▪ I like to experiment with new information technology	0.959		

Source: Processed data (2024)

Reflective Model Assessment

The initial stage of this study evaluated the reliability and validity of each indicator through a reflective model assessment. As represented in Table 2, Cronbach's alpha (CA) and composite reliability (CR) for all constructs fulfilled the cut-off value. This study used the suggested cut-off value by [Hair et al. \(2019\)](#), and it should be higher than 0.70 for those two parameters. The sufficient CA and CR values showed that internal reliability had been

achieved. Then, the validity parameter involves convergent and discriminant validity (Hair et al., 2019). Indicator loading values should be higher than 0.50 in order to achieve convergent validity. As described in Table 2, the values for all outer loadings ranged from 0.778 to 0.959. To test discriminant validity, we considered the resulting HTMT ratio. Hair et al. (2019) suggested that the HTMT ratio between latent constructs did not exceed 0.850. According to Table 3, discriminant validity has been met.

Table 3. Discriminant validity (HTMT Ratio)

Construct	(1)	(2)	(3)	(4)	(5)
(1) Social Media Adoption					
(2) Relative Advantage	0.300				
(3) Cost-Effectiveness	0.655	0.178			
(4) Perceived Compatibility	0.796	0.204	0.270		
(5) Personal Innovativeness	0.620	0.080	0.543	0.498	

Source: Processed data (2024)

Structural Model Assessment

To test our proposed hypotheses, the structural model assessment was applied with a bootstrapping procedure. This study employed the bootstrapping procedure using 500 subsamples for 120 cases to provide paths and their level of significance (see Figure 2). Regarding the level of significance, this study followed Hair et al. (2019), for which the resulting t-value was greater than 1.96. Table 4 reveals that three hypotheses in this study were supported (H2, H3, and H4a), while the rest were not supported (H1, H4b, and H4c). The supported hypotheses have met the statistical significance criteria.

Table 4. Hypotheses testing

Hypothesis	Relationship	Path Coefficient	t-value	Decision
H1	RA → SMA	-0.125	1.474	Not supported
H2	CE → SMA	0.280	4.217**	Supported
H3	PC → SMA	0.427	5.187**	Supported
H4(a)	PI*RA → SMA	-0.248	2.402*	Supported
H4(b)	PI*CE → SMA	-0.204	1.126	Not supported
H4(c)	PI*PC → SMA	0.033	0.331	Not supported

R^2 (Social media adoption): 0.638; Q^2 (Social media adoption): 0.421

* p -value < 0.05; ** p -value < 0.01

Source: Processed data (2024)

In the present study, the resulting R^2 shows that technological factors contributed 63.80% of the changes. Following Cohen's criteria, R^2 values of 0.19, 0.33, and 0.60 are considered weak, moderate, and substantial (Qalati et al., 2022). Thus, our results are considered substantial in terms of social media adoption. Moreover, since the resulting Q^2 value was greater than zero, our model has met the predictive relevance criteria.

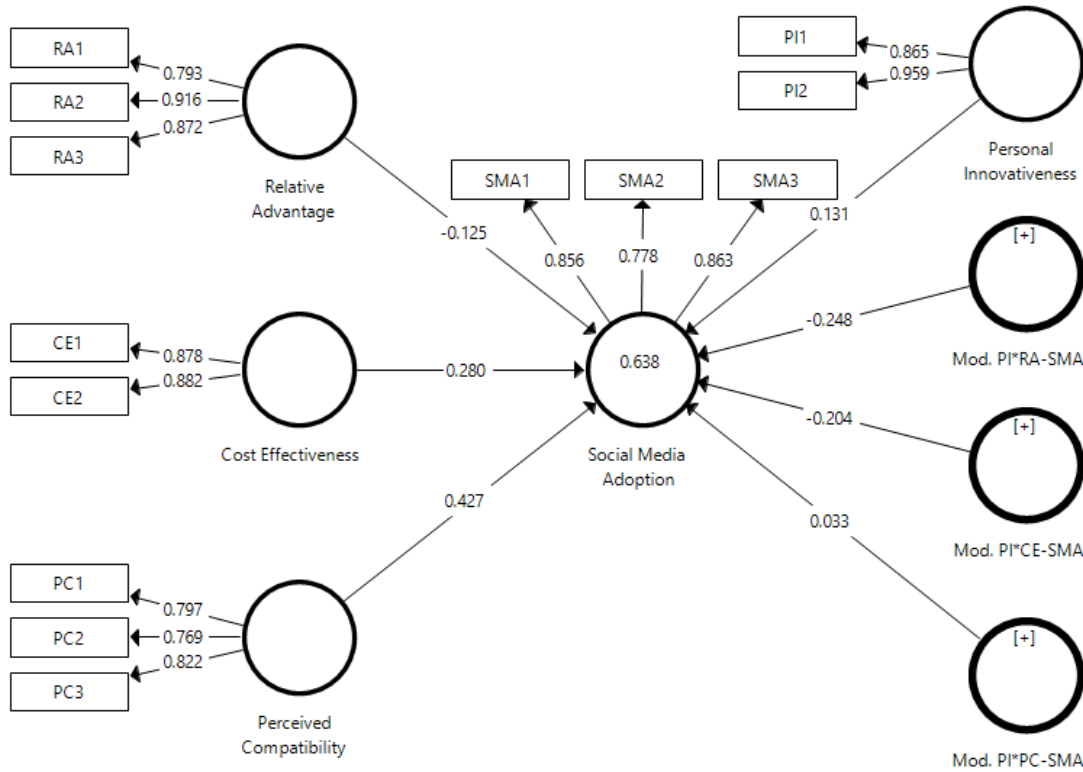


Figure 2. PLS-SEM analysis
Source: Processed data (2024)

Discussion

The main objectives of this present study are to examine the determinants of social media adoption, particularly technological-related factors, and to explore the moderating role of personal innovativeness. Using a quantitative approach, this study provided interesting findings related to social media adoption within micro-enterprises. As shown in Table 4, the first hypothesis has been rejected since the obtained t-value is lower than 1.96. This finding aligns with previous works in the MSMEs context (Amoah et al., 2023; Fu et al., 2024). Although the potential benefits of social media are extremely substantial, there is a lack of understanding from micro-enterprises about this. Further, the second hypothesis in this study has been accepted. This finding confirms previous research in the same context (Qalati et al., 2021, 2022). The relatively low cost of using social media is relevant within micro-enterprises, where lack of funds is common. Social media provides a chance to promote their products and services in an affordable way. The third hypothesis in this study has been accepted, which is consistent with prior findings by Eze et al. (2021) and Qalati et al. (2022). Social media platforms, such as Instagram and WhatsApp, are

highly suitable with the current micro-enterprises infrastructure. In this regard, most business owners employ their smartphones to easily access those social media platforms.

While the influences of technological factors on social media adoption have been clearly examined, this study also tries to explore the moderating impacts of personal innovativeness. Our results indicate that personal innovativeness moderates the relationship between relative advantage and social media adoption (H4a), but it does not have any impact on the other relationships. These results indicate that the influence of relative advantage on social media adoption is greater among micro-enterprises with a low level of innovativeness. For MSMEs with low innovativeness, it is important to evaluate whether adopting social media provides potential advantages such as better marketing processes, greater customer relationships, and broader business intelligence. Instead, in the context of high innovativeness, they tend to disregard those potential benefits. Furthermore, openness to uncertainty and risk are essential characteristics of innovativeness (Wu & Yu, 2022). Thus, the decision to adopt social media is more about being an early adopter than considering the benefits of using the platform itself. The examination of personal innovativeness as a moderating variable illustrates the originality and novelty of this study, as well as increasing our understanding of the social media adoption process in the MSMEs context. It should be borne in mind that research involving personal innovativeness as a moderator in the social media adoption model is still rare.

CONCLUSION

This study concludes that cost-effectiveness and perceived compatibility have a positive and significant effect on social media adoption. It means that technological factors have partially impacted social media adoption in the micro-enterprises context. Moreover, our findings also prove that personal innovativeness has significantly moderated the effect of relative advantage and social media adoption. It becomes a valuable contribution to the existing literature, especially by validating the moderating role of personal innovativeness. From a practical standpoint, these results are essential for related parties, such as the government and platform developers. Precisely, micro-enterprises will consider social media when they perceive that the existing infrastructure is compatible. To accelerate the adoption rate within micro-enterprises, platform developers should design social media that is suitable with limited infrastructure conditions. Developers should also provide educational content regarding the benefits of usage that enhance users' willingness to adopt. On the other hand, the government is expected to provide incentives related to infrastructure improvement. Although this study generates a novel insight into social media adoption literature, some limitations should be considered. First, unit analysis in this study was restricted to only micro-enterprises in Madiun. To increase generalization, future studies are directed to involve micro-enterprises at the provincial level. Second, the current study demonstrates that personal innovativeness only partially moderates technological factors of the adoption

process. There may be additional moderating variables that can be considered in future studies, such as privacy concerns, digital literacy, and cultural value.

REFERENCES

- Ali Abbasi, G., Abdul Rahim, N. F., Wu, H., Iranmanesh, M., & Keong, B. N. C. (2022). Determinants of SME's Social Media Marketing Adoption: Competitive Industry as a Moderator. *SAGE Open*, 12(1), 215824402. <https://doi.org/10.1177/21582440211067220>
- Alkawsji, G., Ali, N., & Baashar, Y. (2021). The Moderating Role of Personal Innovativeness and Users Experience in Accepting the Smart Meter Technology. *Applied Sciences*, 11(8), 3297. <https://doi.org/10.3390/app11083297>
- Alkhateeb, M. A., & Abdalla, R. A. (2021). Social Media Adoption and its Impact on SMEs Performance A Case Study of Palestine. *Studies of Applied Economics*, 39(7). <https://doi.org/10.25115/eea.v39i7.4872>
- Amegbe, H., Zungu, N. P., & Hanu, C. (2023). SMEs Social media adoption and financial and non-financial marketing performance. *Management Science Letters*, 13(3), 162–174. <https://doi.org/10.5267/j.msl.2023.4.005>
- Amoah, J., Bruce, E., Shurong, Z., Egala, S. B., & Kwarteng, K. (2023). Social media adoption in smes sustainability: Evidence from an emerging economy. *Cogent Business & Management*, 10(1), 2183573. <https://doi.org/10.1080/23311975.2023.2183573>
- Amoah, J., & Jibril, A. B. (2021). Social Media as a Promotional Tool Towards SME's Development: Evidence from the Financial Industry in a Developing Economy. *Cogent Business & Management*, 8(1), 192357. <https://doi.org/10.1080/23311975.2021.1923357>
- Anatan, L. & Nur. (2023). Micro, Small, and Medium Enterprises' Readiness for Digital Transformation in Indonesia. *Economies*, 11(6), 156. <https://doi.org/10.3390/economies11060156>
- Cartwright, S., Liu, H., & Raddats, C. (2021). Strategic use of social media within business-to-business (B2B) marketing: A systematic literature review. *Industrial Marketing Management*, 97, 35–58. <https://doi.org/10.1016/j.indmarman.2021.06.005>
- Cvjetkovic, M. (2023). Organizational use and adoption of social media through TOE framework: Empirical research on Croatian small and medium-sized enterprises. *Management*, 28(2), 73–91. <https://doi.org/10.30924/mjcmi.28.2.6>
- Dolega, L., Rowe, F., & Branagan, E. (2021). Going digital? The impact of social media marketing on retail website traffic, orders and sales. *Journal of Retailing and Consumer Services*, 60, 102501. <https://doi.org/10.1016/j.jretconser.2021.102501>
- Effendi, M. I., Sugandini, D., & Istanto, Y. (2020). Social Media Adoption in SMEs Impacted by COVID-19: The TOE Model. *The Journal of Asian Finance, Economics and Business*, 7(11), 915–925. <https://doi.org/10.13106/JAFEB.2020.VOL7.NO11.915>
- Eze, S. C., Chinedu-Eze, V. C. A., & Awa, H. O. (2021). Key Success Factors (KSFs) Underlying the Adoption of Social Media Marketing Technology. *SAGE Open*, 11(2), 215824402110066. <https://doi.org/10.1177/21582440211006695>

- Fan, M., Qalati, S. A., Khan, M. A. S., Shah, S. M. M., Ramzan, M., & Khan, R. S. (2021). Effects of entrepreneurial orientation on social media adoption and SME performance: The moderating role of innovation capabilities. *PLoS ONE*, 16(4), e0247320. <https://doi.org/10.1371/journal.pone.0247320>
- Fowler, K., & Thomas, V. L. (2023). Influencer marketing: A scoping review and a look ahead. *Journal of Marketing Management*, 39(11–12), 933–964. <https://doi.org/10.1080/0267257X.2022.2157038>
- Fu, C.-J., Silalahi, A. D. K., Yang, L.-W., & Eunike, I. J. (2024). Advancing SME performance: A novel application of the technological-organizational-environment framework in social media marketing adoption. *Cogent Business & Management*, 11(1), 2360509. <https://doi.org/10.1080/23311975.2024.2360509>
- Ganguly, K. K. (2024). Understanding the challenges of the adoption of blockchain technology in the logistics sector: The TOE framework. *Technology Analysis & Strategic Management*, 36(3), 457–471. <https://doi.org/10.1080/09537325.2022.2036333>
- Grandón, E. E., & Ramírez-Correa, P. (2018). Managers/Owners' Innovativeness and Electronic Commerce Acceptance in Chilean SMEs: A Multi-Group Analysis Based on a Structural Equation Model. *Journal of Theoretical and Applied Electronic Commerce Research*, 13(3), 1–16. <https://doi.org/10.4067/S0718-18762018000300102>
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Ho, C.-W., & Wang, Y.-B. (2020). Does Social Media Marketing and Brand Community Play the Role in Building a Sustainable Digital Business Strategy? *Sustainability*, 12(16), 6417. <https://doi.org/10.3390/su12166417>
- Kaniawati, K., Sukma, A., & Oktaviani, D. (2024). Leveraging strategic orientations in achieving a competitive advantage among msme: A cross-country marketing analysis. *Jurnal Ekonomi Bisnis Dan Kewirausahaan*, 13(1), 40. <https://doi.org/10.26418/jebik.v13i1.76063>
- Letonja, M., Skok, M. M., & Vrdoljak, I. (2021). Innovativeness of Family Businesses in Slovenia: Do Heirs follow the Founders? *Business Systems Research Journal*, 12(2), 284–304. <https://doi.org/10.2478/bsrj-2021-0033>
- Malita, L. (2011). Social media time management tools and tips. *Procedia Computer Science*, 3, 747–753. <https://doi.org/10.1016/j.procs.2010.12.123>
- Mataruka, L. T., & Muzurura, J. (2023). The adoption of social media tools for enhancing small and medium enterprises' performance: A synthesis of innovation of diffusion and technology-organisation-environment frameworks. *Qeios*, preprint. <https://doi.org/10.32388/XEBM0E.4>
- Matute-Vallejo, J., & Melero-Polo, I. (2019). Understanding online business simulation games: The role of flow experience, perceived enjoyment and personal innovativeness. *Australasian Journal of Educational Technology*, 35(3). <https://doi.org/10.14742/ajet.3862>

- Pateli, A., Mylonas, N., & Spyrou, A. (2020). Organizational Adoption of Social Media in the Hospitality Industry: An Integrated Approach Based on DIT and TOE Frameworks. *Sustainability*, 12(17), 7132. <https://doi.org/10.3390/su12177132>
- Pranoto, A. H., & Lumbantobing, P. (2021). The Acceptance Technology Model for Adoption of Social Media Marketing in Jabodetabek. *The Winners*, 22(1). <https://doi.org/10.21512/tw.v22i1.7073>
- Qalati, S. A., Yuan, L. W., Khan, M. A. S., & Anwar, F. (2021). A mediated model on the adoption of social media and SMEs' performance in developing countries. *Technology in Society*, 64, 101513. <https://doi.org/10.1016/j.techsoc.2020.101513>
- Qalati, S. A., Ostic, D., Sulaiman, M. A. B. A., Gopang, A. A., & Khan, A. (2022). Social Media and SMEs' Performance in Developing Countries: Effects of Technological-Organizational-Environmental Factors on the Adoption of Social Media. *SAGE Open*, 12(2), 215824402210945. <https://doi.org/10.1177/21582440221094594>
- Richter, N. F., Sinkovics, R. R., Ringle, C. M., & Schlägel, C. (2016). A critical look at the use of SEM in international business research. *International Marketing Review*, 33(3), 376–404. <https://doi.org/10.1108/IMR-04-2014-0148>
- Salam, M. T., Imtiaz, H., & Burhan, M. (2021). The perceptions of SME retailers towards the usage of social media marketing amid COVID-19 crisis. *Journal of Entrepreneurship in Emerging Economies*, 13(4), 588–605. <https://doi.org/10.1108/JEEE-07-2020-0274>
- Sarstedt, M., Hair, J. F., Pick, M., Liengaard, B. D., Radomir, L., & Ringle, C. M. (2022). Progress in partial least squares structural equation modeling use in marketing research in the last decade. *Psychology & Marketing*, 39(5), 1035–1064. <https://doi.org/10.1002/mar.21640>
- Senali, M. G., Iranmanesh, M., Ismail, F. N., Rahim, N. F. A., Khoshkam, M., & Mirzaei, M. (2023). Determinants of Intention to Use e-Wallet: Personal Innovativeness and Propensity to Trust as Moderators. *International Journal of Human-Computer Interaction*, 39(12), 2361–2373. <https://doi.org/10.1080/10447318.2022.2076309>
- Sugandini, D., Effendi, M. I., Istanto, Y., & Arundati, R. (2022). Social Media Adoption on SMEs in Indonesia: TOE Model. In B. Alareeni & A. Hamdan (Eds.), *Financial Technology (FinTech), Entrepreneurship, and Business Development* (Vol. 486, pp. 793–804). Springer International Publishing. https://doi.org/10.1007/978-3-031-08087-6_55
- Taherdoost, H. (2016). Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3205035>
- Tambunan, T. (2021). Micro, small and medium enterprises in times of crisis: Evidence from Indonesia. *Journal of the International Council for Small Business*, 2(4), 278–302. <https://doi.org/10.1080/26437015.2021.1934754>
- Ullah, I., Boreli, R., & Kanhere, S. S. (2023). Privacy in targeted advertising on mobile devices: A survey. *International Journal of Information Security*, 22(3), 647–678. <https://doi.org/10.1007/s10207-022-00655-x>

- Wu, W., & Yu, L. (2022). How does personal innovativeness in the domain of information technology promote knowledge workers' innovative work behavior? *Information & Management*, 59(6), 103688. <https://doi.org/10.1016/j.im.2022.103688>
- Wulandari, A., Suryawardani, B., & Marcelino, D. (2020). Social Media Technology Adoption for Improving MSMEs Performance in Bandung: A Technology-Organization-Environment (TOE) Framework. *2020 8th International Conference on Cyber and IT Service Management (CITSM)*, 1–7. <https://doi.org/10.1109/CITSM50537.2020.9268803>
- Yen, Y.-S. (2023). Channel integration affects usage intention in food delivery platform services: The mediating effect of perceived value. *Asia Pacific Journal of Marketing and Logistics*, 35(1), 54–73. <https://doi.org/10.1108/APJML-05-2021-0372>
- Yoon, C., Lim, D., & Park, C. (2020). Factors affecting adoption of smart farms: The case of Korea. *Computers in Human Behavior*, 108, 106309. <https://doi.org/10.1016/j.chb.2020.106309>
- Yu, J., Pauleen, D. J., Taskin, N., & Jafarzadeh, H. (2022). Building social media-based knowledge ecosystems for enhancing business resilience through mass collaboration. *International Journal of Organizational Analysis*, 30(5), 1063–1084. <https://doi.org/10.1108/IJOA-12-2020-2542>
- Zhong, Y., & Moon, H. C. (2023). Investigating the Impact of Industry 4.0 Technology through a TOE-Based Innovation Model. *Systems*, 11(6), 277. <https://doi.org/10.3390/systems11060277>