

Technological, Organizational, and Environmental Factors and Their Effect on SMEs Performance via Social Media

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Abstract :

Globalization and digitalization have intensified competition, presenting challenges and opportunities for SMEs. While social media (SM) offers significant benefits for enhancing performance, empirical evidence on its mediating role between organizational drivers and outcomes remains limited. Furthermore, research applying the Technological-Organizational-Environmental (TOE) framework in this context is relatively novel. This study examines the effect of TOE factors on SME performance through social media. Using a quantitative approach, data were collected via questionnaires from 384 SMEs in Indonesia and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results indicate that technological, organizational, and environmental factors significantly influence social media adoption and SME performance, with technology having the most substantial effect. Social media use also mediates the relationship between TOE and performance. All constructs demonstrated high reliability and validity. The study concludes that improving technological infrastructure, organizational readiness, and environmental awareness—coupled with strategic social media use—can substantially enhance SME performance. These findings provide valuable insights for SMEs and policymakers aiming to leverage digital tools for business growth.

Keywords: *Technological, Organizational, and Environmental, Social Media, Performance, SMEs*

Abstrak:

Globalisasi dan digitalisasi telah memperketat persaingan, menciptakan tantangan dan peluang bagi Usaha Kecil dan Menengah (UKM). Meskipun media sosial (SM) menawarkan banyak keuntungan untuk meningkatkan kinerja, bukti empiris mengenai perannya sebagai mediator antara kerangka *Technological-Organizational-Environmental* (TOE) dan kinerja UKM masih terbatas. Penelitian ini bertujuan untuk menganalisis pengaruh langsung dan tidak langsung faktor TOE terhadap kinerja UKM melalui penggunaan media sosial. Dengan pendekatan kuantitatif, data dikumpulkan melalui kuesioner dari 384 UKM di Indonesia. Data dianalisis menggunakan Partial Least Squares Structural Equation Modeling (PLS-SEM). Hasil penelitian menunjukkan bahwa faktor teknologi, organisasi, dan lingkungan berpengaruh signifikan terhadap adopsi media sosial dan kinerja UKM, dengan teknologi memiliki pengaruh terkuat. Penggunaan media sosial tidak hanya langsung meningkatkan kinerja tetapi juga secara signifikan memediasi hubungan antara faktor TOE dan kinerja. Disimpulkan bahwa peningkatan infrastruktur teknologi, kesiapan organisasi, kesadaran lingkungan, yang terintegrasi dengan strategi media sosial yang konsisten, sangat penting untuk kinerja UKM yang unggul di era digital.

Kata Kunci: *Technological, Organizational, and Environmental, Sosial Media, Kinerja, UKM*

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INTRODUCTION

Small and Medium Enterprises (SMEs) play a strategic role in the economy of every country, including Indonesia. By the end of 2023, the number of SMEs reached over 95% of existing business units, or 66 million units. SMEs contribute the equivalent of IDR 9580 trillion to the formation of Gross Domestic Product and employ 117 million workers. (KADIN Indonesia, 2024). SMEs in Indonesia are facing high uncertainty, rapid market changes, a lack of resources (financial, organizational, and human), and increased competition due to globalization. Other challenges faced by SMEs include innovation and technology, low digital literacy, productivity issues, and licensing problems (Hamurwati, 2024).

Technological advancements are causing changes in many aspects of human life. Advanced technology offers various conveniences, including in business life. In SMEs, technological advancements will lead to business innovation, improved distribution channels, and provide good value to consumers. (Matarazzo et al., 2021). The business world is becoming increasingly accessible to information, more cost-efficient, time-saving, innovative across various fields, and digitalized in transactions and administration.

Organizational performance is an important measure of business success and is measured according to projected output. Organizational performance is influenced by many factors, including the communication technology used for information system development, social media adoption, and transformations in the business environment. SME performance refers to the actual benefits obtained, both in terms of financial and non-financial performance (Hudson et al., 2001). This performance includes an increase in the number of customers and sales transactions, an improvement in service quality, and an increase in the number of actual and potential buyers who see the brand. The improvement in SME performance is influenced by the ability to innovate, adapt to internal and external changes, and the human resources available (Tambunan, 2019).

Not only can large companies adopt social media (SM) and other internet-based strategies without requiring additional resources, but SMEs can also use SM at low cost, with easy technical management and use, and its ability to connect with and reach many consumers. (Tajudeen et al., 2018). The use of social media continues to grow at various business levels. Organizations utilize various social media platforms to enhance their business success. Social media is a tool for promoting products, services, or brands.

In Indonesia, the increased use of social media has been happening since COVID-19 swept across the globe. Consumer behaviour shifting toward online purchases has led SMEs to not only focus on offline sales but also to start using social media to support their sales. There are various types of social media used, such as Facebook, Instagram, LinkedIn, marketplaces, and others. However, there are still SMEs that avoid using social media due to inadequate technical skills and a lack of understanding of how to implement and monitor its use (Nisar & Shafiq, 2019), as well as the high risks associated with social media usage (Beier & Wagner, 2016). Social media does indeed enhance the development of SMEs, but there is still little empirical evidence regarding the adoption and use of social media in SMEs.

Research on the impact of social media use in the past has been conducted and found that social media has a positive impact on SMEs. Social media provides increased reach through brand engagement. (Barlow, 2015), serves as a place for businesses and customers to interact (Gazal et al., 2016) (Qalati et al., 2020), enhances customer loyalty and retention while reducing marketing costs (Qalati et al., 2022a), improves financial and non-financial performance (Ainin et al., 2015; W. Y. C. Wang et al., 2016) and offers easy access to the market without physical presence (World Economic Forum, 2014). SM also does not affect the performance of SMEs (Ahmad et al., 2019). Research on SM acting as a mediator for achieving organizational performance is still limited.

Research on TOE (Technological-Organization-Environment) is a relatively new area of study. The TOE framework has empirical support for its application to SMEs (Eze et al., 2021). TOE is a concept that states that technology, organization, and environment are factors that companies must consider when deciding to innovate. Technological factors include aspects of relative advantage, complexity level, compatibility with existing systems, information technology capabilities, and technical competence. Organizational factors relate to company size, internal readiness level, employee attitudes toward technology use, and business ownership structure. Meanwhile, environmental factors consist of competitive pressure, business partner encouragement, government policy support, and the dynamics of change in the external environment. TOE will influence the performance of SMEs through the use of social media (Qalati et al., 2021; Ausat & Peirisal, 2021; Khalifan et al., 2021; Bawono et al., 2022).

METHOD

This research is a quantitative study. Quantitative research is a study that uses a specific population or sample and is based on the principles of positivism (Ghozali, 2018). This study has three objectives: (1) to analyze the direct influence of TOE (Technological-Organizational-Environmental Pressure) on Social Media Usage, (2) to analyze the direct influence of Social Media Usage on MSME Performance, and (3) to empirically test whether TOE (Technological-Organizational-Environmental Pressure) factors influence MSME Performance through Social Media Usage.

The data collection techniques used consist of two methods: primary data collection is done by distributing questionnaires to respondents for them to answer. Meanwhile, secondary data was obtained through documentation from internal bank information, newspapers, books, and journals that support this research (Sugiyono, 2017).

The population in this study is SMEs that use social media. Researchers used the Lemeshow formula to determine the sample size, resulting in a sample of 384 respondents for this study (Hosmer, et al., 2013). In this study, the researcher used a sampling technique, specifically non-probability sampling with the purposive sampling type, where the sample determination technique is based on certain considerations that have a more dominant connection, allowing it to be used to achieve the research objectives (Sugiyono, 2018). So, the researchers selected SMEs that had a good understanding of the research topic

In this study, the questionnaire was structured in statement sentences, and respondents were asked to answer by placing an "X" mark. To measure the

respondents' answers, a Likert scale was used, with a score of 1 for the lowest response level (strongly disagree) and a score of 5 for the highest response level (strongly agree).

Analisis data yang digunakan dalam penelitian ini adalah menggunakan software SmartPLS. PLS (Partial Least Square) merupakan analisis persamaan struktural (SEM) berbasis varian yang secara simultan dapat melakukan pengujian model pengukuran sekaligus pengujian model Struktural (Evi & Rachbini, 2022). The measurement model is used for validity and reliability testing, while the structural model is used for causality testing. PLS (Partial Least Squares) is a soft modeling analysis because it does not assume the data must be measured on a specific scale, which means the sample size can be small (Ghozali, 2016).

RESULTS AND DISCUSSION

Result

4.1 Descriptive statistical analysis.

The variables in this study consist of TOE (Technological-Organizational-Environmental Pressure), Social Media Usage, and SMEs Performance. Table 4.1 provides information on the overview of the TOE variables, social media usage, and MSME performance from 384 respondents.

Table 1. Descriptive Statistics

Variabel	Rata-rata	Standar deviasi
Technological	3.05	1
Organizational	3.02	1
Environmental	2.97	1.06
Social Media Users	2.72	0.87
SMEs Performance	3.01	0.89

Source: Primary Data Processed by the Author, 2024

Respondents provided assessment scores using a Likert scale with a range of 1 to 5. Based on the analysis in Table 4.1, it was found that social media usage had a low score. This information is very important because it provides insight that the use of social media in strategies for building communication with customers and promoting a product is still not optimal.

4.2 Analisis Partial Least Squares Structural Equation Model (PLS-SEM).

PLS-SEM analysis was used in this study to test the research hypotheses, which consist of.

Ha1: Technological factors have a significant influence on the use of social media by SMEs.

Ha2: Technological factors have a significant influence on the performance of SMEs.

Ha3: Organizational characteristics have a significant influence on the use of social media by SMEs.

Ha4: Organizational characteristics have a significant influence on the performance of SMEs.

Ha5: Environmental characteristics have a significant influence on the use of social media by SMEs.

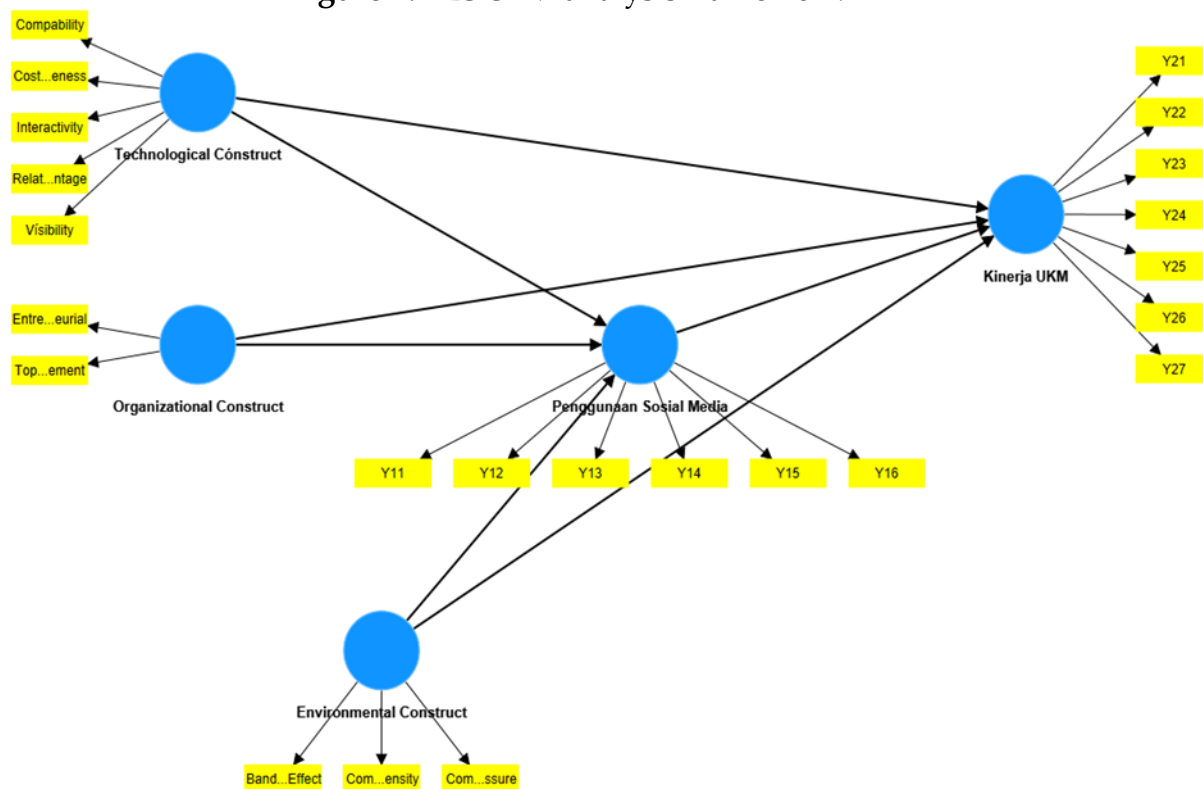
Ha6: Environmental characteristics have a significant influence on the

performance of SMEs.

Ha7: The use of social media has a significant influence on the performance of SMEs.

Ha8: The use of social media mediates the relationship between TOE and the performance of SMEs. The PLS-SEM analysis framework for hypotheses 1 to 7 is as follows.

Figure 1: PLS-SEM analysis framework



Source: Author's Conceptualization, 2024

The results of the hypothesis testing using PLS-SEM are presented in Table 2 below.

Table 2: Hypothesis Testing using PLS-SEM

No	Hypothesis	coefficient	t	P value	Conclusion
1	Technological factors have a significant influence on the use of social media by SMEs.	0.424	11.399	0.000	Proven
2	Technological factors have a significant impact on the performance of SMEs.	0.298	7.684	0.000	Proven
3	Organizational characteristics have a significant impact on the performance of SMEs.	0.266	6.203	0.000	Proven

4	Organizational characteristics have a significant impact on social media usage.	0.370	10.007	0.000	Proven
5	Environmental characteristics have a significant influence on the use of social media by SMEs.	0.344	9.151	0.000	Proven
6	Environmental characteristics have a significant impact on the performance of SMEs.	0.195	5.292	0.000	Proven
7	The use of social media has a significant impact on the performance of SMEs.	0.333	7.029	0.000	Proven

Source: SmartPLS Data Processing Results by the Author, 2024

The technology factor is proven to have a significant influence on the use of social media and the performance of SMEs. A coefficient of 0.424 indicates that a one-unit increase in technological readiness will increase the use of social media by SMEs by 0.424 units. This means that SMEs with good technological infrastructure will be more active in utilizing social media in their business activities. Additionally, the technology factor also influences the performance of SMEs with a coefficient of 0.298, indicating that a one-unit increase in the technology factor will lead to a 0.298-unit increase in SME performance. Both of these relationships are statistically significant ($p\text{-value} = 0.000$), indicating that technology is an important factor driving both social media usage and business performance.

Organizational characteristics also have a significant influence on the use of social media and the performance of SMEs. The coefficient of 0.370 between organizational characteristics and social media usage indicates that for every one-unit increase in organizational factors (such as leadership, work culture, and internal structure), social media usage will increase by 0.370 units. Meanwhile, the coefficient of 0.266 in the relationship between organizational characteristics and MSME performance indicates that a one-unit increase in organizational characteristics will increase MSME performance by 0.266 units. On the other hand, environmental factors are also significant for social media usage (coefficient 0.344) and SME performance (coefficient 0.195). This means that for every one-unit increase in environmental characteristics (such as competitive pressure or regulations), social media usage will increase by 0.344 units, and SMEs performance will increase by 0.195 units.

The use of social media has a significant direct impact on the performance of SMEs. A coefficient of 0.333 indicates that a one-unit increase in the intensity of social media usage will result in a 0.333-unit increase in SME performance. This strengthens the evidence that social media is not just a promotional tool, but also a strategic means to expand markets, increase customer engagement, and accelerate business growth. Overall, this model shows that improvements in technological, organizational, and environmental factors, both directly and indirectly through the use of social media, contribute positively to the performance of SMEs. Therefore, investing in strengthening these factors will have a real impact on the competitiveness and

sustainability of SMEs in the digital era.

The goodness of fit of the model from the analysis framework in Figure 4.1 was measured using the R Square value, Effect size (F-square), and Prediction relevance (Q-square) with the following results.

Table 3. R-square and Q-square values

Variable	R Square	Prediction relevance (Q square)
Performance	0.496	0.342
Social Media Usage	0.426	0.287

Source: SmartPLS Data Processing Results by the Author, 2024

The R-square value (R^2) indicates the proportion of variance in the endogenous construct that can be explained by the exogenous constructs in the model. In these results, the Performance construct has an R^2 of 0.496, which means that approximately 49.6% of the variation in SME performance can be explained by independent variables such as TOE and Social Media Usage. This indicates that the model has moderate explanatory power for Performance. Meanwhile, the Social Media Usage construct has an R^2 of 0.426, meaning that 42.6% of its variance is explained by exogenous constructs, indicating that the model is quite effective in explaining social media usage behavior in the SMEs context. Meanwhile, the Q-square value (Q^2) is used to assess the model's predictive power for endogenous constructs. The Q^2 value for Performance is 0.342 and for Social Media Usage is 0.287, both of which are above the minimum threshold of 0.00, indicating that the model has good predictive relevance. Specifically, the Q^2 value for Performance is close to 0.35, indicating a fairly strong predictive quality. Thus, this model not only statistically explains the relationships between variables but also has a reasonable capability to predict important variables such as MSME performance based on technological, organizational, environmental, and digital behavior factors.

Table 4. F-square values

Relationship between variables	f-square
Environmental Construct -> SMEs Performance	0.06
Environmental Construct -> Social Media Usage	0.21
Organizational Construct -> SMEs Performance	0.11
Organizational Construct -> Social Media Usage	0.24
The use of social media -> SMEs Performance	0.13
Technological Construct -> SMEs Performance	0.13
Technological Construct -> Social Media Usage	0.31

Source: SmartPLS Data Processing Results by the Author, 2024

Based on the f-square value table, it can be interpreted that the Technological Construct variable has the greatest influence on Social Media Usage, with an f^2 value of 0.31, which is categorized as a large effect. This indicates that the technological aspect significantly drives the intensity or quality of social media usage by SMEs. Meanwhile, Organizational Construct and Environmental Construct also have a considerable influence on social media usage, with f^2 values of 0.24 and 0.21,

respectively, which fall into the moderate effect category. This suggests that organizational support and external environmental pressures or opportunities are also important factors in driving social media adoption.

For the SME Performance variable, the highest f^2 values are given by Social Media Usage and Technological Construct, each at 0.13, as well as Organizational Construct at 0.11, all of which fall into the small to near-medium effect category. This indicates that although their influence is not large, these three variables still make a real contribution to improving the performance of SMEs. Meanwhile, the Environmental Construct has the smallest influence on SME Performance ($f^2 = 0.06$), which indicates that the role of the external environment is less significant directly on performance, but plays a greater role indirectly through increased social media usage. Overall, these results support the importance of technology and social media-based approaches in boosting SMEs performance, while also considering organizational and environmental factors.

Table 5. Reliability Values

Variabel	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Environmental Construct	0.90	0.91	0.94	0.83
SME Performance	0.93	0.93	0.94	0.70
Organizational Construct	0.84	0.85	0.93	0.86
Social Media Usage	0.90	0.91	0.93	0.68
Technological Construct	0.93	0.93	0.95	0.79

Source: SmartPLS Data Processing Results by the Author, 2024

Based on the results of the outer model testing, all constructs in this study have met the reliability and convergent validity criteria required in the SEM-PLS approach. The Cronbach's Alpha value for each construct is above 0.70, indicating that the instrument has good internal consistency. Similarly, the composite reliability (ρ_c) values for all constructs were within the range of 0.93 to 0.95, indicating that the indicators for each construct can reliably represent the latent construct being measured. The value of ρ_a (rho_A) is also consistently above the threshold of 0.70, which reinforces the composite reliability results.

The Average Variance Extracted (AVE) values for all constructs have exceeded the minimum value of 0.50, with a range between 0.68 and 0.86. This indicates that each construct can explain more than 50% of the variance in its indicators; thus, convergent validity has been well met. With the fulfillment of all these reliability and validity criteria, the construct in this study is declared suitable for use.

Table 6. Testing the mediating effect of social media use

No	Hypothesis	Coefficient	t	P value	Conclusion
1	The use of social media mediates the relationship between TOE and	0.247	0.824	0.000	Proven

the performance
of SMEs.

Source: SmartPLS Data Processing Results by the Author, 2024

Table 6 presents the test results to examine the mediating effect of the social media usage variable. In this study, a high-order construct was used to test whether social media usage mediates the relationship between TOE and MSME performance. The analysis results prove that social media usage significantly mediates the TOE variable toward MSME performance.

Discussion

This analysis consistently proves that the TOE (Technological-Organizational-Environmental) framework has a significant influence, both directly and indirectly through social media use, on SME performance. Technological factors held the strongest position in driving social media adoption ($\beta=0.424$), followed by organizational ($\beta=0.370$) and environmental factors ($\beta=0.344$) (Lukitaningsih et al., 2024; Qalati et al., 2022b). Social media usage was proven to have a positive and significant impact on improving SME performance ($\beta=0.333$). Furthermore, the model also demonstrated adequate predictive and explanatory power, with R-square values of 0.496 for performance and 0.426 for social media usage, meaning the exogenous variables in the model were able to explain nearly half of the variation in the endogenous variables (Ali Qalati et al., 2020). In addition, all constructs in this study met the criteria for high reliability and validity, as indicated by Cronbach's Alpha and Composite Reliability values above 0.70 and AVE above 0.50, ensuring the accuracy of the measurement instruments used (Mataruka & Muzurura, 2023).

The finding highlighting the dominance of technological factors can be reflected in the context of accelerated digital transformation post-pandemic, which has forced SMEs to adapt to new technologies to remain competitive (Sagala & Öri, 2024). Technological readiness, such as adequate internet infrastructure and user-friendly digital platforms, is a primary prerequisite for SMEs to leverage social media effectively (Pingali et al., 2023). On the other hand, organizational factors, such as leadership support and an adaptive work culture, create an internal environment that encourages experimentation and learning using digital tools (Held et al., 2025; Leso et al., 2023). Meanwhile, environmental pressures, particularly from business competition and the massive shift in consumer behavior to the online sphere, create an external urgency that prompts SMEs to adopt social media to avoid being left behind by competitors and to meet market demand (Fu et al., 2024).

The consequence of the proven causal relationships in this study is that investment in enhancing technological capabilities, strengthening organizational structures, and monitoring environmental dynamics will lead to improved SME business performance, with social media acting as a crucial mediating mechanism (Basit et al., 2024; Fu et al., 2024). Improvements in TOE factors enhance performance directly and indirectly by encouraging more intensive and strategic use of social media, which ultimately leads to increased sales, market expansion, and improved customer loyalty (Tiwasing, 2021). Therefore, SMEs that neglect technological and organizational readiness and ignore environmental pressures risk declining competitiveness and missing out on the growing opportunities the digital economy offers (Asmawati et al., 2024; S. Wang & Zhang, 2025). The implication is that the

digital divide among SMEs could widen, where tech-savvy SMEs will thrive, while those that fail to adapt will be left further behind (Borah et al., 2022).

The findings of this study align with previous research that also confirmed the significant influence of technological and organizational factors on social media adoption and SME performance (Fu et al., 2024). However, this study provides a new contribution by strengthening the evidence that technological factors are the strongest driver, a finding that may be increasingly relevant in the post-pandemic era, where reliance on digital technology is very high (Mishrif & Khan, 2023). A difference emerges when compared to the study by Ahmad et al. (2019), which concluded that social media does not significantly affect performance; this discrepancy may be due to differences in the research context, the maturity level of digital adoption, or differences in measuring performance variables (e.g., financial vs. non-financial performance) (Ahmad et al., 2019; Palladan et al., 2023). This study successfully bridges that gap by showing that the influence of social media is indirect and mediated by the internal and external readiness of the company (TOE), thus providing a more comprehensive explanation (Long Tuan Kechik et al., 2023).

Based on these findings, several actionable recommendations can be proposed. Conceptually, future research needs to expand the TOE model by including other mediating variables, such as dynamic capabilities or digital entrepreneurial orientation, to gain a more holistic understanding (Abdurrahman et al., 2024; Singh et al., 2024). Methodologically, a mixed-methods approach combining quantitative surveys with in-depth interviews is recommended to explore the context and reasons behind the generated statistics more deeply. For policymakers, the key recommendation is to design structured and easily accessible digital literacy training programs for SMEs and provide incentives for the procurement of supporting technological infrastructure (Raharjo et al., 2024; Sagala & Öri, 2024). Governments and business associations also need to create a stable and supportive policy environment by simplifying licensing for digital-based businesses and providing protection for online transactions to strengthen the influence of environmental factors, which, in this study, still had a relatively small direct effect on performance.

CONCLUSION

This study empirically proves that the Technology-Organization-Environment (TOE) framework is a significant driver of SME performance, both directly and indirectly through the utilization of social media. The key findings reveal that technological factors strongly influence social media adoption and usage, followed by organizational and environmental factors. Social media usage is a potent mediator and has a direct, positive, and significant impact on improving SME performance. This confirms that digital initiatives, particularly social media, are not merely supplementary marketing tools but are strategic components capable of translating technological readiness, organizational capabilities, and environmental pressures into tangible performance outcomes, such as increased sales, expanded customer reach, and enhanced service quality.

In terms of significance, this research provides substantial contributions theoretically and practically. Theoretically, it enriches the literature by testing and validating the TOE model in the context of Indonesian SMEs. It also strengthens the role of social media as a crucial mediating variable. This area is still relatively new and

underexplored. Methodologically, using PLS-SEM analysis provides robust and comprehensive evidence of the causal relationships between variables. These findings serve as a roadmap for SME actors and policymakers, emphasizing that investment in technological infrastructure, improving adaptive organizational structures, and monitoring the external environment must be integrated with consistent social media strategies to achieve superior performance.

Despite its contributions, this study has several limitations that open opportunities for future research. Geographically, the scope of the study is limited to a specific region, which restricts the generalizability of the findings to the entire, highly diverse population of Indonesian SMEs. Furthermore, the cross-sectional quantitative approach cannot fully capture social media adoption's dynamics and evolutionary process over time. Therefore, future research should expand the sample's geographical and demographic coverage, adopt a longitudinal approach to understand behavioral changes, and incorporate other variables such as financial factors, human resource quality, and specific digital market conditions to gain a more holistic and in-depth understanding.

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