International Journal of Education Management and Religion
Volume 3 No 1 January 2026
E-ISSN: 3090-3145
https://journal.as-salafiyah.id/index.php/ijemr/index
editoriemr@gmail.com

Analyzing Internal And External Factors Affecting MSME Performance

[1]Muliana, [2]Hikmah
[1,2]Universitas Putera Batam, Indonesia.
[1]mulimuliana0102@gmail.com, [2]Hikmah@puterabatam.ac.id

**Correspondence Email: mulimuliana0102@gmail.com.*

Abstract: *This study aims to analyze the factors that influence the performance of Micro, Small, and Medium Enterprises (MSMEs) in Batam City. MSME performance is a complex function of internal (endogenous) and external (exogenous) pressures, thus requiring a robust analytical framework to measure the relative weight and interaction of these factors. This study uses a survey method as the main approach and a Structural Equation Modeling (SEM) model using SmartPLS on 150 MSME actors in Batam City. The results of convergent validity, discriminant validity, and reliability tests show that all indicators are valid (Outer Loading > 0.7; AVE > 0.5) and reliable (Composite Reliability > 0.6; Cronbach's Alpha > 0.7). The main findings indicate that external factors have a positive and significant effect on internal factors (Path Coeff. 0.328;. P-value 0,000), external factors have a positive and significant effect on MSME performance (Path Coeff. 0.232; P-value 0.025), and internal factors have a positive and significant effect on MSME performance (Path Coeff. 0.253; P-value 0.042). The F-square value indicates that the contribution of these effects falls into the moderate to strong category. In general, all research hypotheses are accepted, confirming that both external and internal factors play an important role in improving the performance of MSMEs in Batam City.*
Keywords*: External Factors, Internal Factors, MSME Performance, Structural Equation Modeling, PLS-SEM, Batam City.*

INTRODUCTION

The role of Micro, Small, and Medium Enterprises (MSMEs) as a catalyst for economic development, job creation, and equitable income distribution is universally recognized, particularly in developing nations and emerging markets (Wang & Zhang, 2025). The contribution of MSMEs to the GDP and overall welfare distribution is undeniable; statistically, this sector dominates over 90% of all business entities and is responsible for absorbing up to 97% of the national workforce (Alfian et al., 2025). The performance trajectory of an MSME is not a linear result of isolated events, but rather a complex function of interconnected pressures arising from both the firm's immediate environment and its internal configuration (Hezam et al., 2025).

The fundamental drivers of MSME performance can be broadly divided into two domains: internal (endogenous) factors and external (exogenous) factors (Villanueva, 2025). Endogenous factors encompass the firm’s controllable resources and capabilities, such as management quality,

financial stewardship, human resource expertise, and, increasingly crucial, the level of digital technology adoption and innovation capacity (Srimulyani et al., 2023). Conversely, exogenous factors, elements beyond the firm's direct control, include the macroeconomic climate (e.g., inflation, interest rates), market dynamics (e.g., competitive intensity, supply chain volatility), and the overarching regulatory and institutional environment (Safón & Iborra, 2025). The contemporary business landscape is further complicated by rapid technological and geopolitical shifts, demanding a more nuanced understanding of these influencing variables (Fraccastoro et al., 2025).

Although previous literature has extensively mapped these factors, most traditional analytical frameworks, such as linear regression models, often struggle to capture the non-linear, moderating, and synergistic effects between internal adaptability and external shocks (Le et al., 2024)(Peng & Li, 2025). For example, a high level of internal digital capability can significantly mitigate the adverse impact of external regulatory changes, while poor internal financial management can amplify the negative effects of external monetary tightening (Clemente-Almendros et al., 2024). Therefore, a sophisticated analysis is required to determine the relative weight and interaction of these forces in predicting and explaining performance outcomes across various operational contexts.

This research is driven by the need to develop a robust, evidence-based analytical framework capable of quantifying the heterogeneous impact of these factors. By moving beyond the limitations of traditional statistics, this study aims to provide a granular understanding of how MSMEs can strategically align their internal resources, particularly their technological capabilities, to build resilience against unpredictable external volatility. The findings are intended to inform targeted policy interventions and precise managerial strategies, thereby contributing to the global agenda of fostering resilient and sustainable MSME ecosystems.

METHOD

This study employs the survey method as its primary approach. The survey method is utilized to obtain a comprehensive overview of the characteristics and various aspects of the population related to the research problem. The research design serves as a systematic guideline or procedure for the process of collecting data relevant to the research objectives. The initial phase of the study

International Journal of Education Management and Religion
Volume 3 No 1 January 2026
E-ISSN: 3090-3145
https://journal.as-salafiyah.id/index.php/ijemr/index
editoriemr@gmail.com

began with observing phenomena occurring in Batam City, followed by the researcher conducting identification and formulation of the problem related to factors affecting the performance of MSMEs (Micro, Small, and Medium Enterprises) in the region. The total number of respondents in this study is 150 MSME actors spread across Batam City. The sampling technique used is purposive sampling, with specific MSME criteria applied for respondent selection

Measurement Model Testing

Model measurement testing was conducted to assess the validity (Convergent Validity and Discriminant Validity) and reliability (Composite Reliability and Cronbach's Alpha) of the research construct.

Convergent Validity

Convergent Validity dinilai melalui nilai outer loading (loading factor) pada masing-masing indikator.

Outer Loading > 0,7

Eq. (1) is the minimum criterion that must be met by each indicator in order to be declared as having a good level of convergent validity. Based on the results, most indicators in the research variables have an outer loading value of more than 0.7. In addition, there are no indicators with an outer loading value below 0.5, so all indicators are declared valid and suitable for use in this study.

Discriminant Validity

Discriminant validity was evaluated using the Average Variance Extracted (AVE) value. A model was considered acceptable if the AVE value for each construct was above 0.5

Variables	AVE	Communality
External Factors	0,721	3 0,742
Internal Factors	0,862	1 0,721
MSME Performance	0,864	2 0,762

Table 1. *Average Variance Extracted (AVE)*

Based on Table 1, all variables have AVE values greater than 0.5, thus meeting the criteria for good discriminant validity. In addition, the communality values obtained are also above 0.5.

Composite Reliability dan Cronbach's Alpha

International Journal of Education Management and Religion
Volume 3 No 1 January 2026
E-ISSN: 3090-3145
https://journal.as-salafiyah.id/index.php/ijemr/index
editoriemr@gmail.com

The reliability of the model was tested using Composite Reliability and Cronbach's Alpha. A construct meets the composite reliability criteria if its Composite Reliability value exceeds 0.6. Meanwhile, the Cronbach's Alpha value for each variable must be above 0.7.

Variables	Composite Reliability	Cronbach Alpha
External Factors	0,8542	0,8217
Internal Factors	0,7652	0,8761
Performance	0,8852	0,8852

Table 2. *Composite Reliability dan Cronbach Alpha*

The results in Table 2 show that all variables have met the criteria for composite reliability and internal reliability, so it can be concluded that overall, the variables in this study have a high level of reliability.

RESULT AND DISCUSSION

This section presents the results of the structural model testing (Inner Model) and the analysis of the key findings.

Results

Convergent Validity is used to assess the extent to which each indicator has a strong relationship with the construct or latent variable it measures. Convergent validity testing is conducted by looking at the outer loading (loading factor) value for each indicator. An indicator is considered to have a good level of convergent validity if its outer loading value exceeds 0.7. The following figure shows the results of the Structural Equation Modeling (SEM) model calculation using SmartPLS, which shows the loading factor values of each indicator on each research variable.

Variables	Indicator	Outer Loading
External Factors	X1.1	0.823
	X1.3	0.752
	X1.4	0.812
	X2.1	0.912
	X3.3	0.832
	X3.4	0.842

Table 3 *External loadings External factors*

International Journal of Education Management and Religion
Volume 3 No 1 January 2026
E-ISSN: 3090-3145
https://journal.as-salafiyah.id/index.php/ijemr/index
editoriemr@gmail.com

Based on the results presented in Table 3, it can be seen that most indicators in each research variable have an outer loading value of more than 0.7. In addition, there are no indicators with an outer loading value below 0.5, so all indicators are declared valid and suitable for use in this study. This condition indicates that each indicator has a high level of convergent validity, thus meeting the criteria for convergent validity. Therefore, the analysis can proceed to the next stage, which is testing discriminant validity.

Variables	Indicator	Outer Loading
Internal factors	Y1.1	0.832
	Y1.2	0.762
	Y1.3	0.843
	Y1.4	0.762
	Y2.1	0.872
	Y2.2	0.874
	Y2.3	0.831
	Y2.4	0.852
	Y3.1	0.891
	Y3.2	0.861
	Y3.3	0.871
	Y3.4	0.863
	Y4.1	0.854
	Y4.2	0.913
	Y4.3	0.818
	Y4.4	0.867

Table 4. *Outer loadings Internal factors*

Based on the results listed in Table 4, it is known that most indicators of each research variable show an outer loading value greater than 0.7. In addition, no indicators were found to have an outer loading value below 0.5, so all indicators are considered valid and suitable for use in this study and can proceed to the next stage of analysis. This finding indicates that each indicator has a good level of convergent validity, thus meeting the criteria for convergent validity. Therefore, the analysis process can proceed to the next stage, namely testing discriminant validity.

Variables	Indicator	Outer Loading
Performance	Z1	0.852
	Z2	0.876
	Z3	0.821
	Z5	0.876

Table 5. *Ouater Loading Performance*

International Journal of Education Management and Religion
Volume 3 No 1 January 2026
E-ISSN: 3090-3145
https://journal.as-salafiyah.id/index.php/ijemr/index
editoriemr@gmail.com

Based on the results listed in Table 5, it can be seen that most indicators from each research variable have an outer loading value of more than 0.7. No indicators with an outer loading value below 0.5 were found, so all indicators are declared valid and suitable for use in this study and can proceed to the next stage of analysis. This condition indicates that each indicator has a high level of convergent validity, thus meeting the criteria for convergent validity. Therefore, the analysis process can proceed to the discriminant validity testing stage.

In addition to observing the cross loading values, discriminant validity can also be evaluated using the Average Variance Extracted (AVE) value. A model is considered good if the AVE value for each construct is above 0.5, which indicates that the proportion of variance explained by the indicator for the construct meets the recommended criteria.

Variables	AVE	Communality
External Factors	0,7213	0,742
Internal Factors	0,8621	0,721
MSME Performance	0,8642	0,762

Table 6 *Average Variance Extracted (AVE)*

Based on the results in Table 6, it can be seen that the external factors, internal factors, and MSME performance variables have an Average Variance Extracted (AVE) value greater than 0.5. Thus, all of these variables can be said to have met the criteria for good discriminant validity. In addition, the communality values obtained are also above 0.5, indicating that the indicators in the model are able to adequately explain the variance of the construct. Furthermore, Composite Reliability testing was conducted to assess the extent to which the indicators in a variable have good internal consistency. A construct is said to meet the composite reliability criteria if its Composite Reliability value exceeds 0.6. The following are the results of the Composite Reliability calculations for each variable used in this study.

Variables	Composite Reliability	Cronbach Alpha
External Factors	0,8542	0,8217
Internal Factors	0,7652	0,8761
Performance	0,8852	0,8852

Table 7 *Composite Reliability dan Cronbach Alpha*

Based on the data presented in Table 7, it is known that all research variables have a Composite Reliability value greater than 0.6. This finding indicates that each variable has met the

International Journal of Education Management and Religion
Volume 3 No 1 January 2026
E-ISSN: 3090-3145
https://journal.as-salafiyah.id/index.php/ijemr/index
editoriemr@gmail.com

composite reliability criteria, so it can be concluded that overall, the variables in this study have a high level of reliability.

Cronbach's Alpha values for each research variable were above 0.7. This indicates that all variables met the required internal reliability criteria. Thus, it can be concluded that all constructs in this study had a high level of reliability. Furthermore, this study presents the results of the Path Coefficient test, Goodness of Fit test, and hypothesis testing. The evaluation of the path coefficient aims to measure the extent of the influence of independent variables on dependent variables in the structural model. Meanwhile, the coefficient of determination (R-Square) is used to assess the proportion of variance in endogenous variables that can be explained by exogenous variables. According to Chin, an R-Square value of 0.67 or higher indicates a strong level of influence, a value between 0.33 and 0.67 is classified as moderate, and a value between 0.19 and 0.33 is classified as weak. Based on the analysis results obtained, the highest path coefficient value was found in the influence of external factors on internal factors, which was 20.459. Furthermore, the second largest influence appears in the relationship between internal factors and MSME performance, which is 4.536, and the third largest influence is between external factors and MSME performance, which is 0.715. These results show that all variables in the model have positive path coefficient values, which means that the higher the coefficient value, then the stronger the influence of exogenous variables on endogenous variables.

Hypothesis	**Patch Coefficient**	**P-Value**	**95% Confidence Interval for Path Coefficient**		***F Square***
			Lower limit	**Upper limit**	
External Factors -> Internal Factors	0.328	0.000	0.021	0.106	0.2984
External Factors -> MSME Performance	0.232	0.025	0.043	0.208	0.283
Internal factors -> MSME performance	0.253	0.042	0.221	0.504	0.284
	0.523	0.028	0.298	0.368	0.817

Table 8. *Hypothesis Testing*
Source: SmartPLS processing results, 2025

International Journal of Education Management and Religion
Volume 3 No 1 January 2026
E-ISSN: 3090-3145
https://journal.as-salafiyah.id/index.php/ijemr/index
editoriemr@gmail.com

Discussion of Results

The Influence of External Factors on Internal Factors

The path coefficient value of 0.328 with a P-value of 0.000 indicates that external factors have a positive and significant influence on internal factors. This finding confirms that a favorable external environment (e.g., policy support, market access, and technological advancements) can enhance the internal capabilities of MSMEs (e.g., managerial, financial, and innovation capabilities). The F-square value of 0.2984 indicates that this influence falls into the moderate category.

These results are consistent with several studies that also found that external factors (particularly government policy, socioeconomic aspects, and the role of relevant institutions) have a significant influence on internal factors of MSMEs (Rasjid et al., 2024)(Siopi & Poufinas, 2023). Pro-business government policies, economic stability, and access to information and funding from relevant institutions can create opportunities or pressures for MSMEs in Batam to optimize their resources, for example by improving the quality of human resources and internal financial management.

The Influence of External Factors on MSME Performance

The test results show a path coefficient of 0.232 with a P-value of 0.025, meaning that external factors have a positive and significant influence on MSME performance. This aligns with the literature that exogenous factors such as economic stability, government policies, and a competitive business environment can increase MSME productivity and business sustainability. The F-square value of 0.283 also places this influence in the moderate category, underscoring the role of this factor in driving performance improvement.

This finding is supported by previous studies stating that government policy aspects, social and economic aspects, and the role of related institutions collectively improve the performance of MSMEs (Singh et al., 2022), (Samputra & Alfarizi, 2025). Although its value (F-square 0.283) is moderate, its influence is crucial because external factors are beyond the control of companies and become a source of strategic opportunities that must be utilized by MSMEs in Batam City.

International Journal of Education Management and Religion
Volume 3 No 1 January 2026
E-ISSN: 3090-3145
https://journal.as-salafiyah.id/index.php/ijemr/index
editoriemr@gmail.com

The Influence of Internal Factors on MSME Performance

A path coefficient value of 0.253 with a P-value of 0.042 indicates a positive and significant relationship between internal factors and MSME performance. Therefore, the better the internal capabilities of MSME actors in terms of management, product innovation, and operational efficiency, the higher their business performance will be. The F-square value of 0.284 is also in the moderate category.

In summary, all inter-variable relationships in the structural model exhibit a positive path coefficient and a P-value < 0.05, which means that all research hypotheses are accepted. This demonstrates that both external and internal factors play a vital role in improving MSME performance in Batam City. The highest F-square value (0.817) indicates a substantially strong contribution to the overall structural model.

These results are in line with the Resource-Based View (RBV) theory, which states that competitive advantage and sustainable performance originate from unique, valuable, and difficult-to-imitate internal resources, such as managerial capabilities, human resource skills, and product innovation (Yunus et al., 2025). The better the internal capabilities of MSME players in management, product innovation, and operational efficiency, the better their business performance will be. The F-square value of 0.284 (medium category) indicates that strengthening internal factors, especially in terms of human and financial resources, is key to achieving optimal performance.

CONCLUSION

The study successfully analyzed and quantified the influence of external factors and internal factors on the performance of MSMEs in Batam City. All tested hypotheses were accepted, confirming the dual-role mechanism where external support enhances internal capacity, which, in turn, boosts performance. Implications and Contribution: This provides actionable insight for local policymakers in Batam, suggesting that interventions should not only target internal improvements but also focus on creating a supportive external environment (e.g., policy, market access) to maximize overall MSME performance. Limitations and Suggestions for Further Research: This study is limited to the PLS-SEM inferential approach. Future research is suggested to incorporate

predictive methodologies, such as Machine Learning (ML) models (e.g., Random Forest or SVR), to better capture potential non-linear and synergistic effects, thereby providing a more nuanced and accurate prediction of firm performance.

REFERENCE

Albuquerque, P. C. C., & Cajueiro, D. O. (2025). *Forecasting political voting: A high dimensional machine learning approach*. Machine Learning with Applications, 22, 100739. https://doi.org/10.1016/j.mlwa.2025.100739

Alfianto, R., & Firdausi, E. R. (n.d.). *Implementation of green human resource management for MSMEs in Indonesia: A review*.

Alfian, A. M., Arrin, N. A., & Alfian, A. (2025). *A systematic review of digital technology adoption in small and medium-sized enterprises: Implications for performance in developing countries* (pp. 417–429). https://doi.org/10.2991/978-94-6463-646-8_25

Arisinta, O., Canda Sakti, N., & Subroto, W. T. (2024). *Increasing the competitiveness of global MSMEs amid inflation rate 2024–2025: Government policy of the Government of Indonesia*. Formosa Journal of Science and Technology (FJST), 3(12), 2581–2596. https://doi.org/10.55927/fjst.v3i12.12694

Clemente-Almendros, J. A., Nicoara-Popescu, D., & Pastor-Sanz, I. (2024). *Digital transformation in SMEs: Understanding its determinants and size heterogeneity*. Technology in Society, 77, 102483. https://doi.org/10.1016/j.techsoc.2024.102483

Chen, X., Zhang, X., Cai, Z., & Chen, J. (2024). *The non-linear impact of digitalization on the performance of SMEs: A hypothesis test based on the digitalization paradox*. Systems, 12(4), 139. https://doi.org/10.3390/systems12040139

El Nemar, S., El-Chaarani, H., Dandachi, I., & Castellano, S. (2025). *Resource-based view and sustainable advantage: A framework for SMEs*. Journal of Strategic Marketing, 33(6), 798–821. https://doi.org/10.1080/0965254X.2022.2160486

Fraccastoro, D. S., Vanninen, D. H., & Gabrielsson, P. M. (2025). *Two decades of research on digitalization, entrepreneurship, and internationalization: What foundations do they provide*

for research on digital entrepreneurial internationalization? International Business Review, 34(4), 102455. https://doi.org/10.1016/j.ibusrev.2025.102455

He, L., Zheng, J., Zhao, M., & Li, T. (2024). *Mapping pathways to responsible innovation: Configurations of digital economy, effectuation, and firm size in SMEs—A fuzzy set qualitative comparative analysis*. Technological Forecasting and Social Change, 209, 123778. https://doi.org/10.1016/j.techfore.2024.123778

Hezam, Y., Luong, H., & Anthonysamy, L. (2025). *Machine learning in predicting firm performance: A systematic review*. China Accounting and Finance Review, 27(3), 309–339. https://doi.org/10.1108/CAFR-03-2024-0036

Kajang, D., Pungus, G., & Sumanti, E. (2025). *Sustainable business and corporate financial sustainability*. Journal of Accounting and Finance Management, 6(2), 598–610. https://doi.org/10.38035/jafm.v6i2.1877

Laiq, M., bin Ali, N., Börstler, J., & Engström, E. (2025). *A comparative analysis of ML techniques for bug report classification*. Journal of Systems and Software, 227, 112457. https://doi.org/10.1016/j.jss.2025.112457

Le, T. T., Le Quan Chau, T., Vo Nhu, Q. P., & Ferreira, J. J. M. (2024). *Digital platforms and SMEs' performance: The moderating effect of intellectual capital and environmental dynamism*. Management Decision, 62(10), 3155–3180. https://doi.org/10.1108/MD-04-2023-0616

Laiq, M., bin Ali, N., Börstler, J., & Engström, E. (2025). *A comparative analysis of ML techniques for bug report classification*. Journal of Systems and Software, 227, 112457. https://doi.org/10.1016/j.jss.2025.112457

Motiramani, M., et al. (2025). *AI-ML techniques for green hydrogen: A comprehensive review*. Next Energy, 8, 100252. https://doi.org/10.1016/j.nxener.2025.100252

Peng, Y., & Li, Z. (2025). *Nonlinear impact of digital service innovation on value creation in manufacturing firms: Based on TOE framework*. Journal of Theoretical and Applied Electronic Commerce Research, 20(4), 263. https://doi.org/10.3390/jtaer20040263

Qachach, A. R., et al. (2025). *Bridging the ESG data gap: Transparent metrics and rankings for emerging financial markets*. International Journal of Financial Studies, 13(4), 198. https://doi.org/10.3390/ijfs13040198

Rasjid, H., Dama, H., & Kamba, A. (2024). *The influence of internal and external factors on the stock price of property & real estate companies*. Journal of Economics, Finance and Management Studies, 7(7). https://doi.org/10.47191/jefms/v7-i7-87

Samputra, P. L., & Alfarizi, M. (2025). *Can advanced society 5.0 technology create economic and social value for millennial and generation Z MSMEs in Surabaya, Indonesia? An economic resilience perspective*. Asia Pacific Management Review, 30(3), 100355. https://doi.org/10.1016/j.apmrv.2025.100355

Safón, V., & Iborra, M. (2025). *Braking before the curve and accelerating inside? Exploration, countercyclical behavior, and SMEs' resilience during economic downturns*. BRQ Business Research Quarterly, 28(1), 252–264. https://doi.org/10.1177/23409444231184483

Seyi-Lande, O., & Onaolapo, C. (2024). *Elevating business analysis with AI: Strategies for analysts*. International Journal of Management Research and Economics, 4(2), 1–7. https://doi.org/10.51483/IJMRE.4.2.2024.1-17

Singh, R., Chandrashekar, D., Subrahmanya Mungila Hillemane, B., Sukumar, A., & Jafari-Sadeghi, V. (2022). *Network cooperation and economic performance of SMEs: Direct and mediating impacts of innovation and internationalisation*. Journal of Business Research, 148, 116–130. https://doi.org/10.1016/j.jbusres.2022.04.032

Siopi, E., & Poufinas, T. (2023). *Impact of internal and external factors on the profitability and financial strength of insurance groups*. International Advances in Economic Research, 29(3), 129–149. https://doi.org/10.1007/s11294-023-09873-y

Srimulyani, V. A., Hermanto, Y. B., Rustiyaningsih, S., & Setiyo Waloyo, L. A. (2023). *Internal factors of entrepreneurial and business performance of SMEs in East Java, Indonesia*. Heliyon, 9(11), e21637. https://doi.org/10.1016/j.heliyon.2023.e21637

Susanti, E., Mulyanti, R. Y., & Wati, L. N. (2023). *MSMEs performance and competitive advantage: Evidence from women's MSMEs in Indonesia*. Cogent Business & Management, 10(2). https://doi.org/10.1080/23311975.2023.2239423

Taheri, B., Hosseini, S. A., & Sedighizadeh, M. (2025). *Novel hybrid fuzzy-SVR model for fault detection in VSC-HVDC transmission lines*. International Journal of Electrical Power & Energy Systems, 172, 111222. https://doi.org/10.1016/j.ijepes.2025.111222

Villanueva, S. M. (2025). *Effectiveness of social media marketing in micro, small, and medium enterprises (MSMEs): Developing strategic social media marketing programs for local entrepreneurs*. www.ijnrd.org

Wang, S., & Zhang, H. (2025). *Digital transformation and innovation performance in small- and medium-sized enterprises: A systems perspective*. Systems, 13(1), 43. https://doi.org/10.3390/systems13010043

Wicaksono, B. B., Audinasari, R., & Mindayani, R. (2023). *Meningkatkan keunggulan kompetitif UMKM di era disrupsi*. Jurnal Riset Ilmu Ekonomi, 3(3), 160–173. https://doi.org/10.23969/jrie.v3i3.71

Yunus, E. N., Ernawati, E., Nuraini, E., & Yuniarti, K. (2025). *Post-crisis growth: Resource orchestration, innovation, and diversification in MSMEs*. Journal of Open Innovation: Technology, Market, and Complexity, 11(2), 100570. https://doi.org/10.1016/j.joitmc.2025.100570

Zheng, Y., Lin, C., Yan, J., & Guo, Y. (2025). *How to enhance the innovation capacity of technology-based enterprises: A fuzzy set qualitative comparative analysis*. International Review of Economics & Finance, 97, 103817. https://doi.org/10.1016/j.iref.2024.103817