

ENHANCING BUSINESS RESILIENCE IN SMES: THE ROLE OF ADAPTIVE LEADERSHIP AND LEARNING VIA DIGITAL READINESS AND DYNAMIC CAPABILITIES

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Abstract: *This study investigates how adaptive resilience and human capital regeneration contribute to strategic sustainability in SMEs, while examining the potential moderating role of institutional flexibility. The research addresses a critical gap in understanding the interplay between organizational capabilities and institutional environments in emerging market contexts. Employing a quantitative research design, data were collected from SMEs in East Java through comprehensive surveys. The analysis utilized Structural Equation Modeling to assess the hypothesized relationships between the key constructs while ensuring robust validity and reliability tests. The results demonstrate that both adaptive resilience and human capital regeneration positively influence strategic sustainability. Contrary to expectations, institutional flexibility does not significantly moderate these relationships, suggesting that internal organizational capabilities may play a more pivotal role than external institutional factors in driving SME sustainability. This study offers novel theoretical insights by challenging conventional assumptions about institutional support in emerging markets. It contributes to the dynamic capabilities literature by highlighting the primacy of internal resilience and human capital development over institutional adaptability for SME sustainability.*

Keywords: *Adaptive Resilience, Human Capital Development, Organizational Sustainability, Institutional Environment, Emerging Market SMEs*

1. Introduction

In recent years, uncertainty in the global business environment has reached unprecedented levels (Jia & Li, 2020; Altig et al., 2022; Szczygielski et al., 2022; Sharma et al., 2020). Economic turmoil, technological disruption, health crises, and regulatory changes have created an increasingly complex competitive landscape, especially for Micro, Small, and Medium Enterprises (MSMEs). As the backbone of the Indonesian economy, MSMEs contribute 61.07% to the GDP (BPS, 2023), making their ability to survive and grow sustainably an urgent strategic issue. However, the main challenges faced by MSMEs in East Java lie not only in external factors, but also in limited internal adaptive capacity and low human resource regeneration, which have the potential to hinder the achievement of long-term sustainability.

The concept of adaptive resilience has emerged as a critical perspective in responding to these challenges (Ivanov, 2022; Latukha et al., 2024; Islam & Chadee, 2024; Galkina et al., 2023; Napier et al., 2024). Unlike traditional resilience, which is reactive in nature, adaptive resilience emphasizes an organization's proactive ability to anticipate disruptions, adapt to

change, and dynamically transform its business (Weise et al., 2020; Mahdiani & Ungar, 2021; Conz & Magnani, 2020). However, this capability does not stand alone; it requires support from human capital regeneration, which is a continuous process of renewing knowledge, skills, and leadership at the organizational level. Without adequate human resource regeneration, efforts to build resilience risk being limited to short-term, unsustainable solutions (Georgescu et al., 2024; Shao et al., 2024; Lu et al., 2023; Al-Maruf et al., 2023).

This is where institutional flexibility becomes a determining factor. MSMEs in East Java often face structural constraints, such as rigid bureaucracy, limited access to financing, and a lack of policy support. Institutional flexibility, the ability to flexibly adjust structures, procedures, and strategies, can act as a catalyst that strengthens the relationship between adaptive resilience, human capital regeneration, and strategic sustainability (Gorondutse et al., 2021; Hamadamin & Atan, 2019; Li & Lin, 2024; Suriyankietkaew et al., 2022). A fundamental question that remains unanswered in the literature is: How do these three factors interact in the context of East Java's unique SME ecosystem?

This research stems from these theoretical and practical gaps. Theoretically, although previous studies have partially examined resilience and human capital, there is no comprehensive framework that integrates them with an institutional dynamics approach in the context of emerging markets. Meanwhile, in practical terms, MSMEs need an operational model that not only helps them survive in the midst of a crisis, but also evolve into resilient and sustainable organizations. By combining the perspectives of dynamic capabilities and institutional adaptation, this study offers a new lens for understanding how MSMEs can transition from merely 'surviving' to 'thriving' in the face of uncertainty.

The findings of this study are expected to not only contribute academically to the development of a more holistic sustainability model, but also provide practical policy and managerial recommendations for stakeholders in East Java, ranging from MSME actors to policy makers. Thus, this study is not only scientifically relevant, but also has a real socio-economic impact in strengthening the resilience of local businesses in an era of high volatility.

Based on the background described above, this study aims to answer a number of key questions related to the strategic sustainability of micro, small and medium enterprises (MSMEs) in East Java. First, this study seeks to determine how adaptive resilience affects the achievement of strategic sustainability in MSMEs. Second, it examines the role of human capital regeneration in mediating the relationship between adaptive resilience and strategic sustainability. Third, it analyses the extent to which institutional flexibility can strengthen or even weaken the interaction between adaptive resilience, human capital regeneration, and strategic sustainability.

This study aims to analyze the direct effect of adaptive resilience on the strategic sustainability of MSMEs, examine the mediating role of human capital regeneration in bridging this relationship, and explore the moderating effect of institutional flexibility as a potential supporting mechanism. With this approach, this study seeks to make a theoretical contribution through the development of an integrative model that links micro-level capabilities such as resilience and human capital with macro-level institutional dynamics. This model is expected to offer a new perspective on how MSMEs can build resilience and strategic sustainability amid uncertain environmental conditions. From a practical standpoint, the results of this study are expected to produce relevant policy recommendations in order to encourage institutional flexibility as a key supporting factor in realizing strategic sustainability in the MSME sector.

Previous studies have made significant contributions to strengthening the theoretical and empirical foundations regarding the factors that influence the resilience and sustainability of micro, small, and medium enterprises (MSMEs), particularly through studies on adaptive

resilience, human capital regeneration, and institutional flexibility. Several studies highlight various relevant approaches and key variables, but there are still gaps that have not been fully bridged in relation to the integration of these three concepts.

Digital transformation has been found to be an important factor in driving organizational sustainability, as revealed by Martínez-Peláez et al., (2023), who showed that digitalization can improve organizational capabilities and strengthen collaboration with stakeholders. However, this study has not yet integrated the role of adaptive resilience and institutional flexibility as key supporting factors.

Apasrawirote & Yawised, (2024) developed a Business Resilience Plans (BRPs) framework based on responsiveness, reactivity, and proactivity, emphasizing the importance of agility and absorptive capacity in strengthening resilience. However, this study did not touch on the aspect of human resource regeneration as a potential mediating variable.

In the context of crisis, Gupta & Kumar Singh, (2023) found that obstacles such as liquidity crises and technical skill shortages were major challenges to the resilience of MSMEs during the COVID-19 pandemic. This research is more reactive in nature and does not emphasize the importance of proactive strategies such as adaptive resilience.

Maheshwari et al., (2020) emphasize the importance of HR management practices and employee relations in promoting commitment to sustainability. Although these findings are in line with the idea of human capital regeneration, the study does not directly link this to the institutional dynamics that also influence the context of sustainability.

Research by Noerchoidah et al., (2025) shows that improvements in digital literacy and human capital contribute significantly to the sustainability of MSMEs. However, this study has not considered how institutional flexibility can act as a moderating variable in this relationship.

The Porter's Diamond-based strategic model developed by Sumba-Bustamante et al., (2024) identifies limited access to finance and technology as the main constraints for MSMEs. This study suggests the need for strategic training, but has not yet examined the role of institutional flexibility in supporting the adaptive capacity of MSMEs to these challenges.

Tjahjadi et al., (2024) revealed that human capital readiness has an influence on business sustainability through market orientation mediation. However, the aspect of institutional flexibility has not been taken into account in their analytical model as a factor that can strengthen or weaken this relationship.

Research by Syamsari et al., (2022) focuses more on the importance of government intervention as a form of external support in strengthening the resilience of MSMEs. This study has not yet incorporated elements of internal capabilities, particularly adaptive resilience, as the foundation for long-term resilience.

Reniasi et al., (2024) stated that leadership strategies have no direct influence on business resilience. These results open up opportunities to explore other more decisive factors, such as the role of institutional flexibility in mediating the influence of various managerial strategies on business outcomes.

Sindhvani et al., (2023) developed the m-TISM model, which identifies the elements that support MSME resilience in a hierarchical manner. Although this model offers a strong conceptual structure, the study has not yet tested the empirical influence of these elements on the strategic sustainability of MSMEs.

Overall, the synthesis of these findings indicates the need to develop an integrative approach that combines adaptive resilience, human capital regeneration, and institutional flexibility within a coherent analytical framework, in order to provide a more comprehensive understanding of the strategic resilience and sustainability of MSMEs amid an ever-changing environment.

Based on the synthesis of previous findings, a number of research gaps can be identified that form an important basis for the original contribution of this study. First, most previous studies have examined adaptive resilience, human capital regeneration, and institutional flexibility separately, without integrating them into a comprehensive theoretical model. No comprehensive approach has been found that systematically combines these three elements within the framework of dynamic capabilities and institutional adaptation. Second, the main focus of previous studies has tended to be on internal capabilities, such as human resources and technology utilisation, while the broader institutional context has not been given much consideration. This has resulted in a lack of understanding of how institutional flexibility can act as a moderating variable in the relationship between adaptive resilience and strategic sustainability. Third, the approach taken in many studies on MSME resilience, especially during crises such as the COVID-19 pandemic, is still reactive. This study aims to fill this gap by emphasising the importance of a proactive approach through the development of adaptive resilience as an anticipatory strategy. Fourth, there is a striking contextual gap, given that the majority of previous studies were conducted in developed countries or on a macro scale. Therefore, this study focuses on SMEs in East Java, Indonesia, which have distinctive institutional, social, and market characteristics, thus providing a new space for contextual and relevant exploration.

Referring to the identified research gap, this study aims to analyse the effect of adaptive resilience on the strategic sustainability of MSMEs in East Java, while also examining the mediating role of human capital regeneration in the relationship between adaptive resilience and sustainability. In addition, this study also seeks to explore the moderating role of institutional flexibility as a mechanism that can strengthen or weaken the relationship between the main variables under review. With this approach, this study is expected to contribute theoretically and practically to the development of a contextual and adaptive strategic sustainability model that responds to external dynamics.

2. Research Method

This study applies an explanatory quantitative approach that aims to test the causal relationship between the main variables in the proposed theoretical model. The research design is cross-sectional, in which data is collected at a specific point in time to obtain an empirical picture of the relationship patterns under study.

The population in this study included all micro, small, and medium enterprises (MSMEs) in East Java Province that had been operating for at least three years. Sampling was conducted using purposive sampling, based on the criteria that MSMEs were engaged in the manufacturing, trade, or service sectors, had at least three employees, and had implemented digital technology in their operational activities. A total of 120 MSME actors participated in this study, which methodologically met the minimum requirement for Structural Equation Modelling (SEM) analysis, namely ten times the number of indicators in the research model.

This study examines four main variables, namely adaptive resilience, human capital regeneration, institutional flexibility, and strategic sustainability. The adaptive resilience variable is operationalized through two indicators, namely the ability to anticipate changes in the business environment and the speed of adaptation to disruptions that occur. The measurement scale uses a five-point Likert scale that reflects the capacity of MSMEs to respond proactively to challenges. The human capital regeneration variable is measured through the intensity of employee training programs and the effectiveness of the knowledge management system within the organization. The use of a five-point Likert scale illustrates the process of continuous renewal and

strengthening of human resource competencies. Institutional flexibility is assessed based on the ease of obtaining business licenses and access to government policies that support SME development. This indicator reflects the flexibility of the institutional environment, which is measured using a five-point Likert scale. Meanwhile, the strategic sustainability variable is measured through financial performance over the last three years and the achievement of long-term business objectives. The measurement scale used is still based on a five-point Likert scale, which describes the ability of MSMEs to maintain their existence while developing sustainably.

The data in this study were collected through two methods, namely a closed questionnaire distributed online to selected respondents and a documentation study of simple MSME financial reports to supplement the quantitative data. Data analysis was performed using the Partial Least Squares-based Structural Equation Modelling (SEM) method through SmartPLS version 4.0 software. The analysis stages included testing the validity and reliability of the constructs through the outer model, which consisted of a convergent validity test with an Average Variance Extracted (AVE) value greater than 0.5, a discriminant validity test with a Heterotrait-Monotrait Ratio (HTMT) value below 0.85, and construct reliability with a composite reliability value of more than 0.7. Furthermore, hypothesis testing was conducted through the inner model, which included path coefficient analysis and significance testing using the bootstrapping technique with 500 resampling. In addition, this study also tested the moderating effect using the interaction effect approach by utilizing latent variable scores to determine the extent to which institutional flexibility influences the strength of the relationship between the main variables in the model.

3. Results and Discussion

3.1. Results

SEM Analysis Results

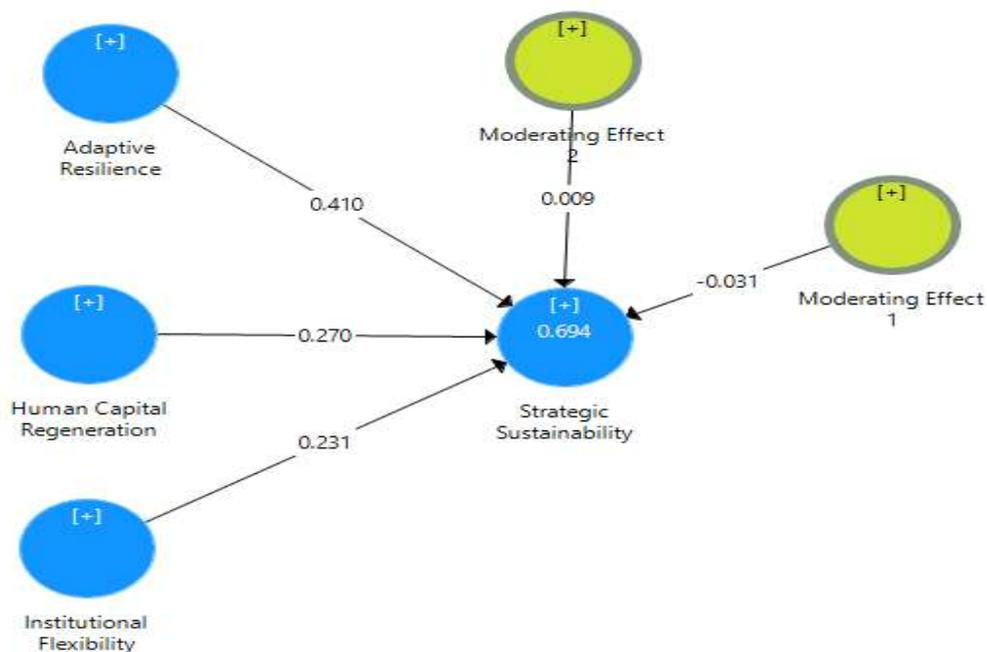


Figure 1. Research Model Design

All constructs in this research model have met the outer loading criteria required in convergent validity analysis. Each indicator that forms the constructs of adaptive resilience, human capital regeneration, institutional flexibility, and strategic sustainability shows an outer loading value above the recommended minimum threshold of 0.70. This indicates that each indicator has a strong and valid contribution in representing the measured construct, so that the model can be said to have good measurement validity at the indicator level.

Table 1. Factor Loadings

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
AR1	0.957	0.957	0.007	130.313	0.000
AR2	0.952	0.951	0.010	99.965	0.000
HCR1	0.885	0.884	0.022	39.357	0.000
HCR2	0.920	0.918	0.017	55.261	0.000
HCR3	0.909	0.905	0.019	47.924	0.000
HCR4	0.898	0.897	0.020	43.888	0.000
IF1	0.945	0.944	0.012	79.875	0.000
IF2	0.946	0.946	0.011	82.670	0.000
Moderating Effect 1	1.528	1.520	0.089	17.161	0.000
Moderating Effect 2	1.565	1.549	0.102	15.402	0.000
SS1	0.937	0.936	0.010	89.834	0.000
SS2	0.921	0.920	0.016	57.112	0.000
SS3	0.940	0.940	0.012	80.480	0.000

Source: Output SmartPLS, 2025

Overall, all constructs in this research model have met the criteria required for construct reliability, convergent validity, and discriminant validity tests. In the construct reliability test, both the composite reliability and Cronbach's alpha values of the four constructs, namely adaptive resilience, human capital regeneration, institutional flexibility, and strategic sustainability, met the recommended minimum standard, which is above 0.70. This indicates that the indicators in each construct have high internal consistency in measuring the intended concept.

In terms of convergent validity, all constructs showed an Average Variance Extracted (AVE) value above 0.50, which means that the proportion of indicator variance that can be explained by the latent construct is sufficient. Thus, each construct has a good ability to explain its indicators comprehensively. Meanwhile, the discriminant validity test evaluated showed that all AVE root values for each construct were higher than the correlation values between constructs. These results indicate that each construct has clear differentiation and there is no overlap in the measurement between variables, so it can be concluded that this research model has adequately fulfilled discriminant validity.

Table 2. Construct Reliability and Validity Values

	Cronbach's Alpha	rho_A	Composite Reliability	(AVE)
Adaptive Resilience (AR)	0.902	0.904	0.953	0.910
Human Capital Regeneration (HCR)	0.925	0.926	0.947	0.816

Institutional Flexibility (IF)	0.881	0.881	0.944	0.893
Moderating Effect 1	1.000	1.000	1.000	1.000
Moderating Effect 2	1.000	1.000	1.000	1.000
Strategic Sustainability (SS)	0.925	0.926	0.952	0.870

Source: Output SmartPLS, 2025

Table 3. Discriminant Test

	AR	HCR	IF	Effect 1	Effect 2	SS
AR	0.954					
HCR	0.770	0.903				
IF	0.725	0.722	0.945			
Effect 1	0.014	0.024	-0.009	1.000		
Effect 2	0.023	0.023	0.004	0.950	1.000	
SS	0.785	0.752	0.724	-0.024	-0.014	0.933

Source: Output SmartPLS, 2025

The results of data analysis using the Structural Equation Modelling (SEM) method with the assistance of SmartPLS software on 120 MSME respondents in the East Java region produced a number of significant findings. First, it was found that adaptive resilience has a positive and significant effect on strategic sustainability, with a coefficient value of 0.410 and significant at a 95 per cent confidence level ($\alpha < 0.05$). This finding indicates that an increase in adaptive resilience directly contributes to the strategic sustainability of MSMEs, especially in facing the dynamics of an uncertain external environment.

Furthermore, human capital regeneration was also found to have a positive and significant effect on strategic sustainability, with a coefficient value of 0.270 and significance also at the $\alpha < 0.05$ level. These results underline the importance of the human resource regeneration process, particularly through the renewal of knowledge and skills, as a key factor in supporting the achievement of long-term sustainability goals for MSMEs.

Table 4. Inter-variable Effect Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
AR -> SS	0.410	0.404	0.088	4.677	0.000
HCR -> SS	0.270	0.280	0.086	3.141	0.002
IF -> SS	0.231	0.228	0.100	2.318	0.021
Moderating Effect 1 -> SS	-0.031	-0.037	0.105	0.297	0.767
Moderating Effect 2 -> SS	0.009	0.013	0.104	0.090	0.929

Source: Output SmartPLS, 2025

However, when testing the moderating role of institutional flexibility, the results showed that this variable did not have a significant effect in strengthening the relationship between adaptive resilience and strategic sustainability, with a p-value of 0.767. Similarly, no significance was found in the moderation of the relationship between human capital regeneration and strategic sustainability, as indicated by a p-value of 0.929. Both p-values are above the significance threshold of 0.05, so it can be concluded that institutional flexibility does not yet

play an effective role as a catalyst in strengthening the relationship between the main variables studied.

3.2. Discussion

The results of this study show a close relationship with two major grand theories, namely the Dynamic Capabilities View and the Resource-Based View (RBV). First, the findings of this study reinforce Teece's view in the Dynamic Capabilities framework, which states that dynamic capabilities, such as adaptive resilience and human capital regeneration, are important determinants in achieving strategic sustainability amid dynamic and unstable business conditions. However, the finding that institutional flexibility does not play a significant role as a moderating variable contradicts the assumption in the Institutional Adaptation theory as stated by Oliver (2021), which states that institutional flexibility should strengthen the effectiveness of dynamic capabilities. Second, in the context of RBV, the results of this study support Barney's (1991) argument, which emphasizes that valuable resources, such as human capital regeneration, contribute significantly to organizational sustainability. However, these findings also reveal the limitations of RBV in explaining the role of the institutional context, which is at the macro level and has an indirect influence on the strategic performance of MSMEs.

Regarding previous research gaps, the results of this study make a significant contribution. First, in terms of theoretical integration, most previous studies, such as those conducted by Gupta and Singh (2022) and Apasrawirote and Yawised (2023), only analyzed adaptive resilience or human capital regeneration separately. This study successfully confirms that both constructs have an independent influence on strategic sustainability, even though the interaction between the two is not reinforced by institutional flexibility. This adds a new understanding to the literature that capabilities at the micro level, such as adaptive resilience and human resource quality, may play a more critical role than macro factors such as institutions, especially in the context of MSMEs in East Java. Second, the insignificant role of institutional flexibility moderation can be explained by the character of local institutions, which still tend to be rigid. In the context of East Java, SMEs face complex bureaucracy and limited access to flexible policies, as also revealed by Syamsari and colleagues (2022). This condition differs from the context in developed countries, as studied by Martínez-Peláez and colleagues (2023), where institutional flexibility is more accessible to small and medium-sized enterprises. Third, from a resilience approach perspective, these findings further support the proactive adaptation framework as described by Helfat and Raubitschek (2018). In this case, MSMEs with high levels of adaptive resilience are able to achieve sustainability without having to rely significantly on flexible institutional support. This corrects the bias in a number of previous studies, such as those conducted by Gupta and Singh (2022), which tend to emphasize reactive resilience strategies during times of crisis without considering proactive adaptation approaches.

The theoretical implications of this study include the development of an integrative model that modifies the dynamic capabilities framework by considering contextual constraints, particularly in the form of institutional rigidity as a factor that can inhibit moderating functions. This study also proposes the need to revise institutional theory, highlighting that in the context of developing countries, institutional flexibility may be less relevant to small MSMEs than their internal capabilities.

In terms of practical implications, the results of this study provide useful guidance for MSME actors and policymakers. For SME actors, it is important to prioritize the development of adaptive resilience, for example through crisis management training or business diversification strategies, as well as encouraging human capital regeneration processes through continuous

employee skills improvement programs. Meanwhile, for the government, these findings emphasize the importance of institutional reform to reduce regulatory rigidity and expand SMEs' access to various flexible incentives that support their adaptability.

The main contribution of this study lies in its theoretical and policy aspects. Theoretically, this study introduces a new perspective on the insignificance of institutional flexibility in the context of MSMEs in developing countries, a finding that has not been widely discussed in previous literature. From a policy perspective, this study provides specific, empirically-based recommendations to strengthen the adaptive capabilities of MSMEs, particularly in facing structural institutional constraints.

However, there are limitations in this study that need to be considered. The limited sample coverage, which was restricted to MSMEs in East Java, may affect the level of generalization of the findings, so caution is needed in applying these results to other regions or contexts. Therefore, it is recommended that future research test similar models in different industrial sectors or use qualitative approaches to explore in greater depth the reasons why institutional flexibility does not play a significant role in the relationship under study.

4. Conclusion

This study successfully answered three research objectives through empirical analysis of MSMEs in East Java. First, the findings confirmed that adaptive resilience has a significant and positive effect on strategic sustainability ($\beta=0.410$), indicating that the ability of MSMEs to proactively adapt in the face of disruption is a key prerequisite for business sustainability. Second, human capital regeneration was also statistically proven to increase strategic sustainability ($\beta=0.270$), reinforcing the proposition that the renewal of human resource competencies acts as a mechanism supporting long-term resilience. Third, an unexpected result was the insignificance of the moderating role of institutional flexibility in both relationships ($p>0.05$), indicating that institutional characteristics in East Java have not been able to function as an effective catalyst for the dynamic capabilities of MSMEs. This finding broadens theoretical insights by showing that in a context of rigid institutions, micro-level factors (resilience and human resources) are more determinative than macro-level factors (institutional flexibility).

Based on these findings, this study recommends two levels of intervention. At the micro level, MSMEs need to develop adaptive resilience-based capacity building programs through risk management training, business model diversification, and strengthening learning organizations. At the macro level, local governments need to reform the institutional ecosystem by: (1) simplifying the licensing bureaucracy, (2) providing flexible incentives for MSMEs that invest in human resource development, and (3) building a collaboration platform between business actors and supporting institutions (universities, industry associations). These policy recommendations are designed to address the key findings regarding the ineffectiveness of existing institutional flexibility, while mitigating the limitations of the research by expanding the sample coverage and institutional variables in further studies.

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