Village Funds, Financial Governance, and Rural Development Performance: Evidence from Central Sulawesi, Indonesia

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ABSTRACT

This study is motivated by the increasing allocation of Village Funds in Indonesia and continuing concerns regarding their effectiveness in advancing rural development. Although fiscal transfers to villages have expanded substantially, disparities in development outcomes and governance capacity remain evident. This study examines the effect of Village Funds on village development performance and considers whether the Village Financial System moderates this relationship. Development performance is measured using the Village Development Index (IDM), which comprises social, economic, and environmental resilience dimensions. Employing a quantitative research design, the study applies multiple linear regression to data from 1,842 villages in Central Sulawesi in 2021, obtained from the Ministry of Villages and the Central Bureau of Statistics. The findings indicate that Village Funds significantly enhance village development performance, while the Village Financial System also has a positive direct effect. However, the system does not strengthen the relationship between Village Funds and development performance, suggesting the need to improve institutional capacity and human resource competence at the village level.

Keywords: Village Funds; Village Financial System; Village Development Performance

Peran Dana Desa dan Dampak Sistem Keuangan Desa terhadap Kinerja Pembangunan Desa di Sulawesi Tengah)

ABSTRAK

Penelitian ini dilatarbelakangi oleh meningkatnya alokasi Dana Desa di Indonesia serta kekhawatiran terhadap efektivitasnya dalam mendorong pembangunan desa. Meskipun transfer fiskal terus meningkat, kesenjangan kinerja pembangunan dan kapasitas tata kelola masih terjadi. Penelitian ini bertujuan menganalisis pengaruh Dana Desa terhadap kinerja pembangunan desa serta peran moderasi Sistem Keuangan Desa. Kinerja pembangunan diukur menggunakan Indeks Desa Membangun (IDM) yang mencakup dimensi ketahanan sosial, ekonomi, dan lingkungan. Metode yang digunakan adalah pendekatan kuantitatif dengan regresi linear berganda pada 1.842 desa di Sulawesi Tengah tahun 2021, menggunakan data sekunder dari Kementerian Desa dan Badan Pusat Statistik. Hasil penelitian menunjukkan bahwa Dana Desa berpengaruh positif signifikan terhadap kinerja pembangunan, dan Sistem Keuangan Desa juga berpengaruh positif secara langsung. Namun, sistem tersebut tidak memperkuat hubungan keduanya, sehingga diperlukan peningkatan kapasitas kelembagaan dan kompetensi sumber daya manusia.

Kata Kunci: *Dana Desa; Sistem Keuangan Desa; Kinerja Pembangunan Desa*

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INTRODUCTION

Efforts to reduce disparities between rural and urban communities have become a central objective of rural development policy. The World Social Report (2021), Reconsidering Rural Development, highlights that differences in quality of life remain a major driver of inequality between rural and urban areas. In Indonesia, rural development has been positioned as a strategic priority under the 2020–2024 National Medium-Term Development Plan (RPJMN), which emphasises the importance of strengthening village capacity and financial autonomy to accelerate more equitable development.

Village development is inherently linked to the availability and management of financial resources. Ambya (2020) states that village development is one of the core responsibilities of village governments and requires adequate financing to support its implementation. This view is reinforced by Medi et al. (2024), who argue that village development plays a strategic role in national and regional development because it directly affects the majority of the rural population. Similarly, Emylia (2019) emphasises that improving community welfare, particularly in rural areas, requires equitable development policies and sectoral strategies to ensure balanced outcomes. To support rural development, the government introduced Village Funds under Law No. 6 of 2014. These funds are transferred from the State Budget to villages through regional governments and are intended to finance development programs, community empowerment, poverty reduction, and improvements in living standards. According to Antou et al. (2019), equitable national development can be achieved only when each village effectively optimises its development potential. Rozandi & Digdowiseiso (2021) further note that Village Funds are expected to align with village work plans to generate tangible improvements in community welfare.

However, the effectiveness of fiscal transfers depends not only on the availability of funds, but also on how these resources are managed. Village financial management encompasses planning, implementation, administration, reporting, and accountability processes (A. Ningsih et al., 2022). In response to the need for improved governance, the Village Financial System was introduced to enhance transparency and accountability in village financial administration. Furqan et al. (2023) argue that the Village Financial System strengthens village autonomy and improves financial management efficiency, while Rivan & Ridwan Maksum (2019) emphasise that an effective financial system is essential to ensure that fiscal resources are allocated appropriately to promote community welfare.

Despite these developments, previous studies have primarily examined the direct effects of Village Funds and the Village Financial System separately, with limited attention given to their interactive relationship. Moreover, existing studies often rely on aggregated development indicators and insufficiently examine the multidimensional nature of village development performance, particularly across social, economic, and environmental dimensions. In addition, prior findings remain inconclusive regarding the role of financial systems in enhancing the effectiveness of fiscal transfers, indicating the need for further empirical investigation across different regional contexts and measurement approaches. Fikri et al. (2020) and Yulita Ferdinandus (2019) show that Village Funds and financial systems contribute positively to rural development performance. However, limited attention has been given to whether the Village Financial System moderates the relationship between Village Funds and rural development

performance. Although Ningsih (2021) found that the Village Financial System does not influence the relationship between village funding and development success, further empirical investigation remains necessary because previous studies differ in terms of variables, contexts, and measurement approaches. Therefore, this study aims to analyse the effect of Village Funds on rural development performance and to examine whether the Village Financial System moderates this relationship. Using data from 1,842 villages in Central Sulawesi Province in 2021, rural development performance is measured using the Village Development Index, which comprises the Social Resilience Index, Economic Resilience Index, and Environmental Resilience Index. By integrating fiscal resource allocation and institutional governance perspectives, this study contributes to the literature by examining the Village Financial System's moderating role through a multidimensional development index. Unlike previous studies, this research provides a more comprehensive analysis by decomposing development performance into social, economic, and environmental resilience. Accordingly, this study examines whether Village Funds significantly influence village development performance and whether the Village Financial System strengthens the relationship between Village Funds and such performance.

The remainder of this article is organised as follows. The next section presents the literature review and the development of the hypothesis. The third section explains the research methodology. The fourth section discusses the empirical findings, and the final section concludes with implications, limitations, and recommendations for future research.

Participatory Development Theory emphasises the active involvement of communities in the planning, implementation, and evaluation of development programs. Development is therefore not merely a top-down initiative led by government, but a collective process that incorporates local participation at each stage. In communication studies, Participatory Development Communication is viewed as an important mechanism for facilitating participatory processes that are aligned with local development dynamics (Hadiyanto, 2008).

Community participation plays a critical role in the success of rural development. Hannan and Rahmawati (2020) and Ngongare et al. (2019) argue that when communities participate actively, development programmes become more targeted and responsive to village needs. In the context of village financial management, community involvement is considered an important determinant of effective fund allocation and monitoring. Putra and Rasmini (2019) and Zaki et al. (2023) find that higher levels of community participation improve the effectiveness of village financial management. Furthermore, participation helps compensate for the financial and administrative limitations faced by village governments (Jaa et al., 2019; Latif et al., 2019; Simanjuntak & Silitonga, 2020). Thus, Participatory Development Theory provides a conceptual foundation for explaining how Village Funds, when supported by community involvement, can contribute to improved village development performance.

Sustainable Development Theory focuses on achieving development that meets present needs without compromising the ability of future generations to meet their own needs. The Brundtland Commission (1987) defines sustainable development as development that fulfils current needs without jeopardising the ability of future generations to fulfil theirs. This framework integrates economic, social, and environmental dimensions.

This perspective is consistent with Asdlori (2023) and Siswanto et al. (2019), who argue that development should enhance present welfare without diminishing future prosperity. In Indonesia, sustainable development principles have been integrated into national development mechanisms (Mahayanti & Hendra, 2021). Sustainable development policies are expected to generate long-term economic growth and strengthen development capacity. Given that village development performance in this study is measured using social, economic, and environmental resilience indicators, Sustainable Development Theory provides a theoretical basis for evaluating whether fiscal transfers contribute to multidimensional rural progress (Mahadiansar et al., 2020).

Accountability Theory centres on transparency, responsibility, and oversight. Transparency refers to the obligation to provide accurate and accessible information; responsibility involves justifying decisions in accordance with the public interest; and oversight ensures that actions align with established objectives (Deseraldo et al., 2024).

The allocation of Village Funds represents a form of fiscal decentralisation aimed at strengthening self-reliant villages and improving governance accountability (W. Ningsih et al., 2020). According to Siregar (2020), village financial management teams are required to provide accountability to the community, with the village head serving as the primary responsible authority. Malumperas et al. (2021) emphasize that the principles of accountability and transparency apply not only at the national level, but also at the village level.

Prasetyo et al. (2023) identify multiple dimensions of accountability in Village Fund management, while Hanafie et al. (2019) and Yanto and Aqfir (2020) highlight that accountability directly reflects village development performance outcomes. Parhusip & Girsang (2023) further state that accountability mechanisms enhance governance performance and service quality. Accountability Theory therefore supports the argument that the Village Financial System may function as an institutional mechanism that strengthens the effectiveness of Village Funds.

Village Funds are intended to accelerate rural development and promote village independence (Daud et al., 2022). Effective management requires transparency, efficiency, compliance with regulations, and the prioritisation of community interests (Irma Seska Arina et al., 2021; Pratama et al., 2021). Development, as described by Lotong Ta'dung and Lusdani (2020) and Precilia et al. (2019), represents a transformative process aimed at improving overall community welfare. Husmayanti (2021) and Rachmat (2019) assert that the government has the authority to determine funding priorities in order to maximise development and empowerment outcomes. Similarly, Fikriman et al. (2020) and Kumenaung (2021) confirm that Village Funds are allocated to support both development initiatives and community empowerment. Based on Participatory Development Theory and Sustainable Development Theory, fiscal resources are expected to support inclusive and multidimensional development outcomes.

H_1: Village Funds have a positive impact on village development performance.

Village financial management must be conducted properly to ensure productive development outcomes (Nurdin & Wijaya, 2019). Villages possess the authority to regulate and manage their finances in accordance with existing regulations (Faizah & Sari, 2022). The Village Financial System was introduced to facilitate reporting, improve efficiency, and optimise financial management processes (Karim, 2020; Watulingas et al., 2019). Zebua et al. (2022) argue that effective financial systems improve governance performance and community welfare. Therefore, in theoretical terms, a well-functioning

Village Financial System should strengthen the impact of Village Funds by enhancing transparency, accountability, and efficiency. However, empirical evidence remains inconclusive regarding whether the financial system amplifies the developmental effect of Village Funds. Based on Accountability Theory, an effective financial system is expected to enhance transparency and efficiency, thereby strengthening the impact of fiscal transfers.

H_2: The Village Financial System moderates the relationship between Village Funds and village development performance.

RESEARCH METHOD

This study employs a quantitative approach using cross-sectional data from 1,842 villages in Central Sulawesi Province in 2021. The sampling technique used in this study is purposive sampling, whereby the sample is selected based on specific criteria relevant to the research objectives. The criteria include villages with complete and available data on Village Funds, the Village Financial System, and the Village Development Index for 2021. Villages with incomplete, inconsistent, or missing data were excluded from the analysis to ensure the validity, reliability, and robustness of the estimation results. Therefore, the final sample consists solely of villages that meet these data-completeness requirements. The data used in this study are secondary data obtained from the Ministry of Village Affairs and the Central Bureau of Statistics (BPS). Village Fund realisation data are sourced from official Village Fund reports, while information on the Village Financial System and the Village Development Index is obtained from BPS publications.

This study employs one dependent variable, one independent variable, one moderating variable, and two control variables. The dependent variable is village development performance, measured using the Village Development Index (IDM). The independent variable is Village Funds, while the Village Financial System serves as the moderating variable. To control for structural and geographical differences across villages, topography and travel distance to the regency office are included as control variables. The operational definitions, measurement methods, and data sources for all variables are presented in Table 1.

Table 1. Operationalization of Variables and Data Sources

Name	Operationalization of Variables	Source
Village Development Index	The Building Village Index is composed of three composite components: the social resilience index, the economic resilience index, and the environmental resilience index.	Central Bureau of Statistics (BPS)
Village Funds (ln)	The value of the realization of the village fund allocation is measured using the natural logarithm (LN).	Ministry of Villages
Village Financial System	The variable indicating the existence of the Village Financial System is measured using 3 categories: 1) Not Available, 2) Available & Not Updated, 3) Available & Updated.	Central Bureau of Statistics (BPS)
Topography	The village topography is measured using 4 categories: 1) Peak/Cliff, 2) Slope, 3) Plain, 4) Valley.	Central Bureau of Statistics (BPS)
Travel Distance	The travel distance is measured by the number of kilometers between the village head's office and the regency office.	Central Bureau of Statistics (BPS)

Source: Research Data, 2024.

To test the proposed hypotheses, this study employs multiple linear regression and Moderated Regression Analysis (MRA). The moderating effect is examined through the interaction term between Village Funds and the Village Financial System. Descriptive statistics, correlation analysis, and multicollinearity diagnostics using the Variance Inflation Factor (VIF) are conducted to assess the robustness of the model estimation. Statistical significance is evaluated at conventional levels.

RESULTS AND DISCUSSION

To test the proposed hypotheses, the following econometric model is estimated:

$$VDI_{it} = \beta0 + \beta1VF_{it} + \beta2VFS_{it} + \beta3(VF_{it}\times VFS_{it}) + \beta4TOPO_{it} + \beta5DIST_{it} + \varepsilon_{it} \quad \ldots\ldots (1)$$

Where:

VDI_{it} = Represents the Village Development Index
VF_{it} = Denotes Village Funds (natural logarithm of realized funds)
VFS_{it} = Represents the Village Financial System
$VF_{it}\times VFS_{it}$ = Captures the moderating effect
$TOPO_{it}$ = Control variables
$DIST_{it}$ = Control variables
ε_{it} = The error term

The coefficient β_1 captures the direct effect of Village Funds on development performance (H1), while β_3 represents the moderating effect of the Village Financial System (H2).

A complete description of the descriptive statistics of the variables in this study can be seen in Table 2 below.

Tabel 2. Descriptive Statistics of Variables

Variable	Obs	Mean	Standard Deviation	Min	Max
VDI_{it}	1,842	0.67	0.08	0.39	0.91
VF_{it} *	1,842	0.86	0.18	0.54	2.97
VFS_{it}	1,842	2.83	0.48	1	3
$VF_{it}\times VFS_{it}$	1,842	20.66	0.34	20.05	20.11
$TOPO_{it}$	1,842	2.32	0.49	1	4
$DIST_{it}$	1,842	85.49	69.82	1	999

Number of Observations = 1.842
Explanation of Variable Operationalization in Table 1.
**) In billion rupiahs*

Source: Research Data, 2024.

Table 2 presents the descriptive statistics for the variables used in this study. The sample comprises 1,842 village observations from Central Sulawesi in 2021. The average Village Development Index (VDI) is 0.67, with a range of 0.39 to 0.91. This indicates that, on average, villages in Central Sulawesi exhibit a moderate level of development performance, although considerable variation exists across villages. Village Funds (VF), measured in billion rupiahs, have a mean value of 0.86, with allocations ranging from 0.54 to 2.97. This variation reflects differences in fiscal allocation and funding distribution across villages. The Village Financial System (VFS) has an average score of 2.83 on a scale of 1 to 3, suggesting that most villages have implemented and updated their financial systems. The relatively low standard deviation of 0.48 indicates limited dispersion in financial system implementation status.

The interaction term (VF × VFS) shows limited variation, with a mean of 20.66 and a narrow range between 20.05 and 20.11, reflecting the mechanical construction of the interaction variable. Regarding the control variables, the average topography score (TOPO) is 2.32, indicating that most villages are located in relatively flat or moderately sloped areas. The average travel distance (DIST) between village offices and regency offices is 85.49 kilometres, with substantial dispersion (SD = 69.82), suggesting heterogeneity in accessibility across villages. Overall, the descriptive statistics reveal sufficient variability in fiscal allocation, governance systems, and geographical characteristics to support the subsequent regression analysis.

Table 3 presents the Pearson correlation matrix for the research variables. Overall, the correlations between the independent variables and the dependent variable (VDI) are relatively weak, suggesting that multicollinearity is unlikely to pose a serious concern. Village Funds (VF) show a positive, statistically significant correlation with VDI ($r = 0.062$, $p < 0.05$), suggesting a preliminary association between fiscal allocation and village development performance. Similarly, the Village Financial System (VFS) is positively correlated with VDI ($r = 0.056$, $p < 0.05$), suggesting that villages with better financial system implementation tend to exhibit slightly higher development performance. The interaction term (VF × VFS) does not show a significant correlation with VDI ($r = -0.015$, $p > 0.05$). However, this result does not necessarily indicate the absence of a moderating effect, as moderation must be examined through regression analysis rather than simple correlation coefficients.

Table 3. Correlation Analysis of Variables

Var	VDI_{it}	VF_{it}	VFS_{it}	$VF_{it} \times VFS_{it}$	$TOPO_{it}$	$DIST_{it}$
VDI_{it}	1.000					
VF_{it}	0.062**	1.000				
	(0.007)					
VFS_{it}	0.056**	0.022	1.000			
	(0.015)	(0.335)				
$VF_{it} \times VFS_{it}$	-0.015	0.528***	-0.831***	1.000		
	(0.519)	(0.000)	(0.000)			
$TOPO_{it}$	0.154***	-0.063**	0.005	-0.043	1.000	
	(0.000)	(0.006)**	(0.804)	(0.059)		
$DIST_{it}$	-0.044	0.024	0.045	-0.023	0.102***	1.000
	(0.055)	(0.286)	(0.051)	(0.320)	(0.000)	

Number of observations = 1.842
Explanation of Variable Operationalization in Table 1
**** & ** = P-value significant 1% & 5%*

Source: Research Data, 2024.

Regarding the control variables, topography (TOPO) shows a positive, significant correlation with VDI ($r = 0.154$, $p < 0.01$), suggesting that topographical characteristics may influence development outcomes. Travel distance (DIST) shows a weak, marginal relationship with VDI. Importantly, although the interaction term is mechanically correlated with its constituent variables (VF and VFS), the magnitudes of the correlations do not indicate perfect multicollinearity. This is further examined using Variance Inflation Factor (VIF) diagnostics in the regression analysis. Overall, the correlation matrix provides preliminary evidence of associations among variables while indicating that the relationships are not excessively strong, thereby supporting the suitability of regression analysis.

Table 4. Hypothesis Testing

Panel A. Before Moderation	
Variable	VDI_{it}
_CONS	-0.030
	(0.901)
VF_{it}	0.030***
	(0.010)
VFS_{it}	0.008***
	(0.010)
$TOPO_{it}$	0.025***
	(0.000)
$DIST_{it}$	-0.000**
	(0.024)
Prob > F	0.000
Adj R-Squared	0.036
Vif	1.01
Panel B. After Moderation	
Variable	VDI_{it}
_CONS	0.005
	(0.982)
VF_{it}	0.052
	(0.322)
VFS_{it}	-0.004
	(0.885)
$VF_{it} \times VFS_{it}$	-0.022
	(0.663)
$TOPO_{it}$	0.025***
	(0.000)
$DIST_{it}$	-0.000**
	(0.024)
Prob > F	0.000
Adj R-Squared	0.036

Number of observations = 1.842
Explanation of Variable Operationalization in Table 1.
**** & ** = P-value significant 1% & 5%.*

Source: Research Data, 2024.

Table 4 presents the regression results before and after the inclusion of the interaction term. In Panel A, Village Funds (VF) show a positive and statistically significant effect on the Village Development Index (VDI) ($\beta = 0.030$, $p < 0.05$). This result supports H1, indicating that higher Village Fund allocations are associated with improved village development performance. The positive coefficient suggests that fiscal transfers strengthen social, economic, and environmental resilience at the village level. The Village Financial System (VFS) also exhibits a positive and significant coefficient ($\beta = 0.008$, $p < 0.05$), implying that villages with more advanced financial system implementation tend to achieve slightly higher development outcomes. Regarding the control variables, topography (TOPO) has a positive and highly significant effect on VDI ($\beta = 0.025$, $p < 0.01$), indicating that geographical characteristics play an important role in shaping development performance. Travel distance (DIST) shows a negative, significant effect ($p < 0.05$), suggesting that villages farther from the regency centre tend

to have slightly lower development performance. The overall model is statistically significant (Prob > F = 0.000), although the adjusted R-squared value of 0.036 indicates that only a modest proportion of the variation in village development performance is explained by the included variables. The mean VIF of 1.01 confirms the absence of serious multicollinearity.

Panel B presents the results after introducing the interaction term (VF × VFS) to test the moderating effect. The coefficient of the interaction term is negative and not statistically significant ($\beta = -0.022$, $p > 0.05$). This indicates that the Village Financial System does not significantly moderate the relationship between Village Funds and village development performance. Therefore, H2 is not supported. In addition, after including the interaction term, the direct effects of Village Funds and the Village Financial System become statistically insignificant. This may suggest that the interaction structure does not meaningfully alter the baseline relationship identified in Panel A. The control variables remain consistent with the baseline model. Topography continues to show a positive, significant association with VDI, while travel distance maintains a negative, significant relationship. The overall model remains statistically significant, with an unchanged adjusted R-squared value of 0.036.

Village Funds play a crucial role in rural development performance, as they serve as the primary financial source for implementing programmes that improve community welfare. The empirical findings of this study confirm that Village Funds have a positive and significant effect on the Village Development Index (IDM), thereby supporting H1. This result demonstrates that fiscal transfers at the village level directly strengthen development performance. With these funds, village governments can finance the construction of basic infrastructure, such as roads, bridges, and irrigation systems, that facilitate economic and social activities. In addition, Village Funds support community empowerment programmes, including training initiatives and small-business assistance, that enhance economic capacity and create employment opportunities. The allocation of Village Funds also contributes to improvements in healthcare, education, and sustainable natural resource management, thereby promoting long-term welfare enhancement.

This finding is consistent with Wibowo (2019), who states that village finances are prioritised to fund village-scale development and community empowerment initiatives. Similarly, Sari et al. (2020) emphasize that Village Funds are directed towards improving the welfare of village residents, enhancing the quality of human life, and alleviating poverty. The results are also aligned with Suryo Wibowo & Sulistya Hapsari (2022), who argue that sustainable village development must be accompanied by transparent and accountable financial management in accordance with applicable regulations. From a theoretical perspective, Participatory Development Theory holds that fiscal resources enable villages to respond to local needs through community-based planning, while Sustainable Development Theory emphasises the need to balance economic, social, and environmental dimensions in development. Therefore, the acceptance of H1 confirms that fiscal capacity remains a fundamental driver of rural development performance.

However, the moderating hypothesis (H2) is rejected because the interaction between Village Funds and the Village Financial System is not statistically significant. This indicates that although the financial system is important for governance, it does not significantly strengthen the relationship between fiscal transfers and development performance. The rejection of H2 does not imply that the Village Financial System is

irrelevant; rather, it suggests that its presence alone is insufficient to enhance the marginal impact of Village Funds on development outcomes. Several explanations may clarify this finding. Development performance is influenced by multiple interrelated factors, including human resource capacity, community participation, leadership quality, and the alignment of development planning with local needs. Even when a financial system is formally implemented, development performance may not improve if these supporting factors are weak. Dhika et al. (2022) note that the Village Financial System is often perceived as complicated and prone to operational errors. Watulingas et al. (2019) further highlight limitations in human resources and the lack of mastery among village staff in operating the application, both of which reduce its effectiveness. Putu et al. (2020) also emphasize that the quality of human resources significantly affects accountability and transparency in village financial management. These findings suggest that technical systems alone cannot guarantee a stronger development impact without adequate institutional capacity and managerial competence.

In light of Accountability Theory, transparent and structured financial management systems are expected to improve governance performance. However, this study indicates that accountability mechanisms may function primarily as compliance tools rather than as strategic instruments for optimising development outcomes. While financial systems contribute to administrative order and reporting discipline, they may not substantially amplify the developmental benefits of fiscal transfers when human and organisational capacities are limited. Consequently, the rejection of H2 highlights the importance of strengthening institutional quality beyond formal regulatory compliance.

The findings demonstrate that fiscal transfers play a significant and substantive role in improving village development performance, while the financial system's moderating role remains limited. The integration of Participatory Development Theory, Sustainable Development Theory, and Accountability Theory suggests that effective rural development requires not only adequate funding and transparent systems, but also strong institutional capacity, community engagement, and strategic planning. Thus, sustainable village development can only be achieved when financial resources, governance mechanisms, and human capabilities operate synergistically.

To provide deeper insight into the robustness of the main findings, this study conducts additional tests by decomposing the Village Development Index (IDM) into its three constituent dimensions: social resilience, economic resilience, and environmental resilience. These tests aim to examine whether the effects of Village Funds and the Village Financial System remain consistent across different aspects of development performance. Furthermore, moderation analysis is applied to assess whether the Village Financial System strengthens the relationship between Village Funds and each dimension of village development. The results of these additional estimations are presented in Table 5.

Table 5. Achievement of Each IDM Indicator

Variabel	SRI (Before)	SRI (After)	ERI (Before)	ERI (After)	ENRI (Before)	ENRI (After)
_CONS	0.228 (0.222)	0.229 (0.259)	-1.004*** (0.003)	-1.042*** (0.005)	0.685** (0.022)	0.829 (0.011)
VF	0.023*** (0.010)	0.024 (0.641)	0.069*** (0.000)	0.044 (0.634)	-0.001 (0.912)	0.089 (0.279)
VFS	0.008** (0.012)	0.008 (0.785)	0.015** (0.011)	0.029 (0.583)	0.002 (0.708)	-0.051 (0.285)
VF×VFS	–	0.000 (0.987)	–	0.024 (0.794)	–	0.090 (0.263)
TOPO	0.019*** (0.000)	0.019*** (0.000)	0.038*** (0.000)	0.038*** (0.000)	0.017*** (0.002)	0.016*** (0.002)
DIST	0.000*** (0.000)	0.000*** (0.000)	0.000 (0.528)	0.000 (0.531)	-0.000*** (0.000)	0.000*** (0.000)
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000
Adj R^2	0.026	0.026	0.031	0.030	0.010	0.010

SRI = Social Resilience Index
ERI = Economic Resilience Index
ENRI = Environmental Resilience Index
VF = Village Funds
VFS = Village Financial System
*** p < 1% ; ** p < 5% ; ns = not significant
N = 1,842 villages

Source: Research Data, 2024.

Additional tests were conducted to examine whether the effects of Village Funds and the Village Financial System differ across the three dimensions of the Village Development Index, namely the Social Resilience Index (SRI), Economic Resilience Index (ERI), and Environmental Resilience Index (ENRI). This decomposition provides a more detailed understanding of which aspects of development are most responsive to fiscal transfers and governance mechanisms. The results indicate that, before moderation, Village Funds have a positive and significant effect on both social resilience and economic resilience. This suggests that fiscal transfers primarily strengthen the social and economic foundations of rural development. In the social dimension, Village Funds are generally allocated to education services, healthcare access, social protection programmes, and community empowerment activities. These programmes directly enhance human development and social cohesion, which explains the significant association observed in the Social Resilience Index. Similarly, the strong positive effect on the Economic Resilience Index indicates that Village Funds contribute to local economic stimulation by supporting infrastructure development, micro and small enterprises, and productive sector financing. This pattern confirms that fiscal decentralisation at the village level generates tangible improvements in socio-economic performance. However, Village Funds do not show a significant effect on the Environmental Resilience Index before moderation. This finding suggests that environmental resilience may be less sensitive to short-term fiscal allocation.

Environmental sustainability often depends on long-term ecological management, regulatory enforcement, and community awareness, which may not respond immediately to increases in budget size. Thus, fiscal transfers appear to produce more immediate outcomes in the social and economic sectors than in the environmental dimension. After including the interaction term, the Village Financial System's moderating effect remains statistically insignificant across all three dimensions. The interaction between Village Funds and the Village Financial System does not significantly influence social, economic, or environmental resilience. This consistency across the models reinforces the main regression findings, indicating that the financial system does not function as a strengthening mechanism in the relationship between fiscal transfers and development performance. While the Village Financial System contributes to administrative structure and reporting discipline, its presence does not significantly amplify the impact of fiscal transfers on any specific development dimension.

The control variables provide additional insight. Topography consistently shows a positive and significant association across all resilience dimensions, indicating that geographical characteristics systematically shape development outcomes. Villages with more favourable geographical conditions tend to demonstrate stronger social, economic, and environmental resilience. Meanwhile, travel distance exhibits differentiated effects: it positively influences social resilience, does not significantly affect economic resilience, and shows a significant relationship with environmental resilience. These variations suggest that spatial accessibility influences development dimensions differently, highlighting the importance of territorial context in rural development analysis. Although the adjusted R-squared values remain relatively modest across all models, this is expected given the multidimensional and complex nature of development indicators. Social, economic, and environmental resilience are influenced by numerous structural, institutional, and socio-cultural factors beyond fiscal allocation and financial systems. Nevertheless, the consistent significance of Village Funds in the social and economic dimensions strengthens the conclusion that fiscal capacity plays a substantive role in enhancing village development performance. The additional tests demonstrate that the impact of fiscal transfers is dimension-specific, with stronger effects on social and economic resilience than on environmental resilience. Furthermore, the absence of a moderating effect across all dimensions confirms that improving formal financial systems alone is insufficient to enhance the developmental impact of fiscal transfers without complementary improvements in institutional capacity and governance quality.

CONCLUSION

This study examines the effects of Village Funds and the Village Financial System on the Village Development Index, and the moderating role of the Village Financial System in strengthening the relationship between fiscal transfers and development performance. The results indicate that Village Funds have a positive and significant effect on village development performance. This finding confirms that fiscal transfers at the village level play a substantial role in improving social and economic resilience. The additional tests further reveal that the impact of Village Funds is more pronounced on the Social Resilience and Economic Resilience Indices, while the Environmental Resilience Index appears less responsive to direct fiscal allocation. These findings suggest that fiscal

decentralisation effectively strengthens the socio-economic dimensions of rural development.

However, the Village Financial System's moderating role is not supported. The interaction between Village Funds and the Village Financial System does not significantly influence either overall village development performance or any individual resilience dimension. This indicates that while financial systems contribute to governance structure and administrative accountability, they do not significantly amplify the developmental impact of fiscal transfers. The findings imply that institutional systems alone are insufficient without adequate human resource capacity and governance quality. This study concludes that fiscal capacity remains a primary driver of village development performance, whereas the strengthening effect of formal financial systems is limited in the absence of broader institutional support.

Based on the findings of this study, several suggestions can be proposed. First, policymakers should continue strengthening the effectiveness of Village Fund allocation by ensuring that fiscal transfers align with local development priorities, particularly in the social and economic sectors. Given the limited impact on environmental resilience, greater attention should be directed towards integrating environmental sustainability programmes into village development planning. Second, improvements to the Village Financial System should not focus solely on technical compliance and reporting requirements. Stakeholders need to enhance human resource capacity through continuous training, improved digital literacy, and strengthened managerial competence. Institutional reform must be accompanied by capacity building to ensure that financial systems function as strategic development tools rather than merely administrative instruments. Third, future research is encouraged to incorporate additional institutional and socio-cultural variables, such as leadership quality, community participation, governance transparency, and political dynamics, to obtain a more comprehensive understanding of village development performance. Expanding the observation period or employing alternative methodological approaches may also provide deeper insights into the long-term impact of fiscal decentralisation.

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