

The Impact of State Budget Funding on Innovation in Vietnam: The Moderating Role of Institutional Quality

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Abstract: This study examines the impact of state budget (SB) capital on national innovation outcomes and clarifies the moderating role of institutional quality in this relationship in Vietnam. Employing quarterly time-series data spanning from the first quarter of 2011 to the fourth quarter of 2025 and applies the ARDL-ECM model to assess both the long-run and short-run relationships between state budget expenditure and innovation outcomes, the empirical results indicate that state budget spending on science and technology contributes positively to innovation only when accompanied by high institutional quality. Innovation performance in Vietnam depends not merely on the scale of public expenditure, but more critically on the institutional environment, which determines the extent to which public resources are effectively transformed into innovation outcomes.

Keywords: innovation; state budget; institutions

I. Introduction

In Vietnam, according to the Law on Science and Technology, the state budget is required to allocate at least 2% of total annual budgetary expenditure to science and technology, with gradual increases aligned with sectoral development needs, in order to ensure the implementation of key scientific missions and the enhancement of national science and technology capacity. However, in practice, the level of expenditure has remained relatively modest. Specifically, the share of state budget expenditure on science and technology amounted to 1.72% in 2022, 1.39% in 2023, and 1.97% in 2024 (Ministry of Finance, 2022, 2023, 2024).

Under the 2026 policy orientation, the State intends to allocate at least 5% of total budgetary expenditure to science and technology, innovation, and digital transformation, while fostering broad societal participation in policy processes. Therefore, conducting quantitative research to examine the impact of state budget expenditure on innovation in Vietnam, as well as the moderating role of institutional quality, is essential for deriving policy recommendations and strategic directions to strengthen science, technology, and innovation policies in the current period.

The remainder of this article is organized as follows. Section 2 reviews the literature and develops the research hypotheses; Section 3 outlines the methodology; Section 4 presents the empirical findings; and Section 5 concludes.

II. Literature review and hypothesis development

2.1. Literature review

a. Innovation

From the perspective of classical economics, Schumpeter (1934) defines innovation as the introduction of new combinations - new products, new methods of production, new markets, new sources of supply, or new forms of organization that disrupt equilibrium and drive economic development. Building on this foundation, the Organisation for Economic Co-operation and Development (OECD) broadens the concept of innovation by viewing it as the process of developing and successfully applying new knowledge. In this approach, innovation is not only confined solely to inventive activities, but also encompasses the entire process of transforming knowledge and inventions into applications that generate practical and economic value (OECD, 2005).

Under Vietnam's Law on Science, Technology, and Innovation (2025), innovation refers to creating and applying technical, technological, and managerial solutions to improve socio-economic effectiveness, productivity, quality, and product added value. This definition emphasizes an application-oriented approach aligned with sustainable development goals

The Global Innovation Index (GII), published by the World Intellectual Property Organization (WIPO), is widely regarded as one of the most influential instruments for assessing and ranking national innovation capacity. The GI reflects countries' innovation performance through groups of indicators related to knowledge and technology outputs as well as creative outputs, thereby serving as an important reference framework for academic research and policy formulation (Tran Lan Huong et al., 2024).

b. The Impact of State Budget on Innovation

Based on endogenous growth theory, state budget expenditure on science and technology and innovation increases knowledge accumulation and research intensity, thereby promoting innovation output. This theory argues that economic growth is driven by internal factors, especially investment in human capital, innovation, and knowledge (Romer, 1990; Aghion & Howitt, 1992). Ding et al. (2024) employ a fixed effects model to empirically estimate the impact of government expenditure on R&D on innovation across 37 OECD countries over the period of 2000 to 2021. The results indicate that public spending on R&D has a positive effect on innovative competence and this effect varies depending on a country's level of innovative competence and government effectiveness. The study of Guellec & Van Pottelsberghe De La Potterie (2003) also demonstrates that direct government funding for R&D performed by firms has a positive impact on private R&D.

At the same time, developmental state theory (Johnson, 1982; Mazzucato, 2013, 2018) expands the role of the state budget from correcting market failures to shaping and steering strategic innovation fields through the funding of high-risk projects, public procurement, and mission-oriented programs. In this context, the state assumes the role of a lead investor, willing to bear high levels of risk to develop foundational technologies that the private sector tends to avoid.

Under public goods theory, the role of the state budget on innovation is further reinforced. According to Samuelson (1954), scientific and technological knowledge possesses full characteristics of public goods, particularly in basic research. This principle implies that markets cannot independently provide the foundational knowledge required for innovation. Studies by Nelson (1959) and Dasgupta and David (1994) demonstrate that public investment in basic research constitutes a critical prerequisite for long-term technological breakthroughs.

From an institutional and policy perspective, national innovation system (NIS) theory views state budget funding as a central element linking innovation actors. Freeman (1987), Lundvall (1992), and Nelson (1993) argue that innovation is not a linear process but rather the outcome of interactions among firms, the state, research institutes, and

universities. Within this viewpoint, the state budget plays a financial coordinating role, facilitating research collaboration, technology transfer, and the formation of innovation networks.

c. The role of Institutional Quality

According to New Institutional Economics (NIE) (North, 1990), institutions are understood as a system of formal and informal rules that govern economic behavior and determine the efficiency of public resource allocation and utilization. In the relationship between the state budget and innovation, the scale of public expenditure itself does not guarantee the generation of innovation; rather, the effectiveness of public spending depends critically on institutional quality. High-quality institutions help reduce transaction costs, reduce leakages of public resources, and enhance the efficiency of budget allocation for research and development (R&D).

Based on this theoretical framework, Alam et al. (2019) identify that key institutional pillars such as corruption, government effectiveness, rule of law, and regulatory quality as playing an important role in shaping R&D investment. Specifically, government effectiveness, the rule of law, and political stability exert positive effects, whereas corruption and political instability have negative impacts on R&D investment in emerging markets.

The Institution-Based View (IBV) (Veblen, 1899; North, 1990) posits that firms' behavior and innovation strategies are strongly influenced by the institutional environment. In transparent and effective institutional environments, R&D subsidies and government support tend to amplify firms' innovation investment and enhance innovative performance. Conversely, under conditions of weak institutional quality, such policy supports may be neutralized or induce compliance-oriented innovative behavior (Li and Atuahene-Gima, 2001; Guo et al., 2016; Barasa et al., 2017).

Based on state failure theory (Buchanan & Tullock, 1962; Olson, 1965; Niskanen, 1971), numerous empirical studies indicate that government intervention in innovation does not always generate positive effects; instead, it may lead to misallocation of resources, rent-seeking behavior, and crowding-out effects on private investment when institutional frameworks are insufficiently robust. Firm-level evidence further suggests that government subsidies increase symbolic or superficial innovation, crowd out private R&D investment, and encourage rent-seeking behavior, particularly in contexts characterized by weak institutions and ineffective monitoring mechanisms (Wallsten, 2000; Guo et al., 2016; Howell, 2017).

2.2. Hypothesis development

According to endogenous growth theory, technological innovation and knowledge accumulation are the fundamental drivers of long-term economic growth. However, knowledge exhibits non-rival characteristics and generates spillover externalities, leading the private sector to invest in innovation at a level below the social optimum. Therefore, public expenditure on science and technology is regarded as an intervention instrument to address market failures through: providing financial support for science, technology, and innovation; developing research infrastructure; reducing the risks and marginal costs of innovation activities; and shaping technological absorptive competence within the economy. Following this reasoning, as the share of budgetary expenditure on science and technology increases, the inputs of the innovation system (research resources, human capital, physical infrastructure and knowledge networks) also expand, thereby improving innovation outcomes as measured by the output pillar indices of the Global Innovation Index (GII). Numerous empirical studies have documented a positive relationship between public expenditure on science and technology and innovation outcomes, particularly in developing economies where the private sector lacks sufficient incentives and capacity to self-finance R&D (Sahin, 2023; Seitkan et al., 2024; Voutsinas et al., 2018).

Hypothesis H1: The share of state budget expenditure on science and technology has a positive impact on innovation outcomes in Vietnam.

However, under conditions of an underdeveloped public governance system, the relationship between public expenditure on science and technology and innovation may be non-linear or even negative. This is because public spending may give rise to problems such as distorted resource allocation driven by administrative incentives or vested interests, the funding of inefficient or form-oriented projects, resource leakage and waste due to corruption or inadequate oversight mechanisms, and “crowding-out” effects on private-sector investment in innovation. In cases budgetary expansion is accompanied by low efficiency in capital utilization, public expenditure fails to generate new knowledge and may instead reduce the efficiency of social resource allocation, thereby exerting a negative impact on innovation outcomes (Manzhi Liu et al. 2022; Cai et al. 2022).

Hypothesis H1b: State budget expenditure on science and technology has a negative impact on innovation in Vietnam.

In the research context, institutions are regarded as the foundational determinant of the extent to which public resources are transformed into socio-economic outcomes, particularly innovation. According to institutional theory, a good institutional environment helps reduce transaction costs, mitigate uncertainty, and create incentives for firms to engage in innovation and the commercialization of knowledge. At the same time, strong institutions enhance the efficiency of public expenditure through mechanisms of transparency, oversight, and accountability, thereby reducing resource leakage and improving the quality of project selection. Consequently, institutional quality is expected to increase the effectiveness of state budget expenditure on science and technology in promoting innovation. In the model, this is reflected by a positive coefficient on the interaction term between budgetary expenditure and institutional quality (Bruno & Jorge, 2016).

Hypothesis H2a: Institutional quality enhances the effectiveness of the impact of state budget expenditure on science and technology on innovation in Vietnam.

Nevertheless, certain institutional improvements may entail stricter procedural controls, tighter disbursement processes, and higher compliance requirements. This may slow the implementation of state budget expenditure on science and technology or reduce flexibility in innovation experimentation, particularly in the short term. Moreover, if institutional improvements emphasize “procedure-based governance” rather than “performance-based governance,” rising administrative and compliance costs may weaken the capacity to translate budgetary resources into innovation. Therefore, in some periods, institutional quality may reduce the effectiveness of the impact of state budget expenditure on innovation (Wencong Ma et al., 2023; Letícia Brilhante, 2025).

Hypothesis H2b: Institutional quality reduces the effectiveness of the impact of state budget expenditure on science and technology on innovation in Vietnam.

III. Data and Research Methodology

3.1 Data

To examine the impact of state budget funding on innovation in Vietnam and to clarify the moderating role of institutional quality in this relationship, this study employs a time-series dataset covering the period from Q1 2011 to Q4 2025, comprising 60 observations. The data were compiled from two primary sources. First, indicators measuring innovation and institutional quality were obtained from the Global Innovation Index (GII) reports published by the World Intellectual Property Organization (WIPO). Second, variables capturing fiscal policy and the macroeconomic environment - including the share of state budget expenditure on science and technology (gov), the nominal exchange rate (ex), and trade openness (open) - were collected from the General Statistics Office of Vietnam (GSO).

3.2 Research Variables

a. Dependent Variable

Innovation output (inno) is employed as the dependent variable in this study. It is measured using the Innovation Output Sub-Index of the Global Innovation Index (GII), published by the World Intellectual Property

Organization (WIPO). In particular, the Innovation Output Sub-Index directly captures the extent to which an economy can transform innovation-related inputs into tangible innovation outcomes.

According to WIPO’s methodology, the Innovation Output Sub-Index consists of two core dimensions: Knowledge and Technology Outputs and Creative Outputs. In this study, inno is constructed as the average value of these two dimensions in order to comprehensively represent innovation outcomes through both the knowledge-technology channel and the creative-intellectual asset channel. Knowledge and Technology Outputs reflect technical innovation outcomes such as knowledge creation, patent activity, high-technology exports, knowledge diffusion, and knowledge-based value added. Creative Outputs, in contrast, capture innovation driven by creativity, including creative goods and services, branding, industrial design, intangible assets, and content production.

b. Independent variable

In this study, public expenditure on science and technology is proxied by the share of state budget expenditure allocated to science and technology relative to total state budget expenditure (gov). This indicator captures the extent to which the government prioritizes knowledge creation and innovation capacity-building activities. Moreover, it has been widely employed in empirical studies on public support for innovation because it enhances comparability across periods and mitigates biases arising from differences in the absolute scale of budget expenditure.

$$gov = \frac{\text{State budget expenditure on science and technology}}{\text{Total state budget expenditure}} \times 100$$

The measurement unit is percentage (%), where a higher value indicates a greater budgetary priority assigned to science and technology.

The definitions and data sources of the variables are reported in Table 1.

Table 1. Data sources and variable construction

Variable	Description	Unit	Source
Independent variable			
gov	Share of state budget expenditure allocated to science and technology relative to total state budget expenditure	Percent (%)	General Statistics Office of Vietnam (GSO) (https://www.nso.gov.vn/)
Dependent variable			
inno	Innovation output (average of the Innovation Output Sub-Index components in the GII)	Index score (0-100)	Global Innovation Index (GII), WIPO (https://www.wipo.int/en/web/global-innovation-index)
Moderating variable			

inst	Institutional quality (Institutions pillar of the GII - Innovation Input Sub-Index)	Index score (0-100)	
Control variables			
ex	Nominal exchange rate	(USD/VND)	Authors' compilation
open	Trade openness of the economy	Percent (%)	

The empirical model is specified in its general form as follows:

$$\ln inno_t = \alpha_0 + \sum_{i=1}^p \alpha_i \ln inno_{t-i} + \sum_{j=0}^{q_1} \beta_j c_gov_{t-j} + \sum_{k=0}^{q_2} \gamma_k c_inst_{t-k} + \sum_{r=0}^{q_5} \delta_r (c_gov \times c_inst)_{t-r} + \sum_{n=0}^{q_4} \theta_n ex_{t-n} + \sum_{r=0}^{q_5} \phi_r \ln open_{t-r} + u_t$$

inno: Innovation output, measured as the average of the Innovation Output Sub-Index components in the GII.
gov: Share of state budget expenditure allocated to science and technology relative to total state budget expenditure.

inst: Institutional quality, proxied by the Institutions pillar of the GII (Innovation Input Sub-Index).
gov × inst: Interaction term capturing the moderating effect of institutional quality on the relationship between public S&T expenditure and innovation output.

ex: Nominal exchange rate

open: Trade openness
p, q₁, ..., q₅: Optimal lag lengths selected based on the Akaike Information Criterion (AIC).
u_t: White-noise error term.

IV. Model Results and Discussion

Prior to estimating the ARDL model, the study conducts unit root tests to ensure that all variables satisfy the stationarity requirement. Specifically, the Augmented Dickey-Fuller (ADF) test, developed by Dickey and Fuller (1979), is employed to determine the order of integration of each time-series variable. The results indicate that *ln(inno)*, *c_gov*, *c_inst*, and *Inter* are stationary at level, i.e., integrated of order zero I(0). For the remaining variables, stationarity is achieved after first differencing, implying that they are integrated of order one I(1). These findings satisfy the key condition for applying the ARDL framework: the series must be integrated of order I(0) or I(1), and none of the variables may be integrated of order I(2).

Based on the unit root test results reported in Table 4.1, the variables are stationary either at level (*ln_inno*, *c_gov*, *c_inst*, *inter*) or at first difference (*ln_ex*, *ln_open*) at conventional significance levels of 1%, 5%, and 10%.

Table 4.1. Augmented Dickey-Fuller (ADF) Unit Root Test

Variable	ADF test statistic	1% Critical	5% Critical	10% Critical	P-value
ln_inno	-3,431	-4,137	-3,494	-3,176	0,0473
c_gov	-3,519	-4,137	-3,494	-3,176	0,0374
c_inst	-2,469	-2,402	-1,675	-1,298	0,0085
inter	-3,673	-4,137	-3,494	-3,176	0,0242
ln_ex	-4,183	-2,403	-1,676	-1,299	0,0001
ln_open	-2,422	-2,403	-1,676	-1,299	0,0095

Source: Authors' calculations using Stata 17

Table 4.2. Empirical Results for Optimal Lag Length Selection

Lag	LogL	LR	df	p	AIC	HQIC	SBIC
0	157.609				-5.31961	-5.23603	-5.10455
1	556.730	798.24	36	0.000	-18.0607	-17.4757*	-16.5553*
2	605.343	97.225	36	0.000	-18.5033	-17.4167	-15.7075
3	649.622	88.557*	36	0.000	-18.7937*	-17.2057	-14.7076

Source: Authors' calculations using Stata 17

Given the characteristics of the time-series data, the relatively limited sample size, and the dynamic structure of the model - particularly the inclusion of the interaction term (Inter) - the study adopts the Akaike Information Criterion (AIC) to determine the optimal lag length. As noted by Pesaran and Shin (1999) and Lütkepohl (2005), compared with the Schwarz Criterion (SC), AIC provides greater flexibility in lag selection, captures the underlying dynamics of the data more effectively, and reduces the likelihood of omitting relevant lag structures. Failure to include appropriate lags may lead to biased estimates and weaken the ability to detect long-run relationships among variables, especially within a dynamic ARDL framework.

The results suggest that the model performs best when the lag orders for ln_inno, c_gov, c_inst, inter, ln_ex, ln_open are 3, 1, 0, 1, 3, and 3, respectively.

With a sample size of 60 observations, the study further applies the ARDL bounds testing approach proposed by Pesaran, Shin, and Smith (2001) to examine the existence of a cointegration relationship among the variables.

Table 4.3. ARDL Bounds Test for Cointegration

	10%		5%		1%		p-value	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F	2.338	3.645	2.791	4.254	3.839	5.647	0.001	0.010
t	-2.476	-3.772	-2.823	-4.180	-3.518	-4.987	0.000	0.004

Source: Authors' calculations using Stata 17

The bounds test reports an F-statistic of 5.688, which is greater than the upper bound I(1) critical values at the 10%, 5%, and 1% levels. Hence, (H0) of no cointegration is rejected, indicating the presence of a long-run relationship among the variables.

Table 4.4. Long-run Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	95% conf.interval	
c_gov	0.0228	0.0594	0.38	0,702	-0.0971	0.1428
c_inst	0.0155	0.0140	1.11	0,275	-0.0128	0.0438
inter	0.0546	0.0145	3.75	0,001	0.0252	0.0839
ln_ex	0.4677	0.8099	0.58	0,567	-1.1693	2.1047
ln_open	-0.3746	0.1503	-2.49	0,017	-0.6784 ;	-0.0708

Source: Authors' calculations using Stata 17

The coefficient on public science and technology expenditure (c_gov) is positive but statistically insignificant in the long run. This finding suggests that merely increasing the scale of public spending on science and technology is insufficient to generate a sustained impact on innovation outcomes. In other words, policy efforts should not focus solely on expanding budgetary allocations, but rather on improving the quality and efficiency of public resource utilization. This result is consistent with North's institutional theory (Douglass North, 1990), which emphasizes that

the effectiveness of resource deployment depends critically on the institutional environment governing incentives, allocation mechanisms, and enforcement structures.

Next, institutional quality (*c_inst*) exhibits a positive coefficient but remains statistically insignificant, suggesting that although institutions are expected to play a supportive role in fostering innovation, their long-run effect may not be sufficiently robust when considered in isolation. This implies that institutional improvements need to be combined effectively with other complementary factors - such as targeted public investment mechanisms, absorptive capacity, and innovation-oriented governance - to generate more persistent innovation outcomes. At the same time, this finding reinforces North's argument (1990) that effective institutions constitute a necessary condition for directing economic resources toward productive uses and for generating sustained long-term value creation.

The estimated interaction term between state budget support and institutional quality (*Inter*) is positive, sizable, and highly significant, indicating that institutional quality strengthens the innovation returns to public S&T spending. This aligns with Acemoglu, Johnson, and Robinson (2005), who argue that the effectiveness of economic policies crucially depends on the institutional framework under which they are implemented. In contexts characterized by stronger institutions, public resources are more likely to be allocated transparently and efficiently toward science and technology programs, thereby enhancing firms' incentives to innovate and accelerating technological upgrading. Conversely, weak institutions may undermine policy effectiveness by fostering misallocation, rent-seeking, and distortions, ultimately reducing the long-run innovation impact of public spending. Taken together, the findings highlight institutional quality as a key determinant of the long-run effectiveness of innovation policy in Vietnam.

The long-run coefficient on the exchange rate (*ln_ex*) is positive, indicating a potential pro-innovation association of exchange-rate dynamics. Nonetheless, the estimate is statistically insignificant, implying that exchange-rate effects may be secondary and are likely to influence innovation outcomes only in conjunction with other enabling factors.

Finally, trade openness (*ln_open*) is estimated to have a negative and statistically significant long-run effect, suggesting that greater economic openness may exert adverse impacts on innovation performance when domestic capabilities and supporting institutions remain insufficient. This finding is consistent with Rodrik (1998), who argues that trade liberalization can intensify competitive pressures, thereby constraining domestic firms' ability to sustain investment in science and technology unless accompanied by stronger internal innovation capacity and appropriate policy support.

Table 4.5 presents the estimated short-run dynamics obtained from the error correction representation of the ARDL model, following the bounds testing procedure for cointegration.

Table 4.5. Short-run Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D.ln_inno(-1)	0.1216	0.0904	1.34	0.186
D.ln_inno(-2)	0.1298	0.0857	1.51	0.138
D.c_gov	-0.1650	0.0441	-3.74	0.001

D.inter	0.0258	0.0148	1.74	0.089
D.ln_ex	1.0298	0.5889	1.75	0.088
D.ln_ex(-1)	0.7097	0.5617	1.26	0.214
D.ln_ex(-2)	1.2740	0.5406	2.36	0.023
D.ln_open	0.1688	0.0591	2.86	0.007
D.ln_open(-1)	0.1841	0.0508	3.63	0.001
D.ln_open(-2)	0.1580	0.0418	3.78	0.001
_cons	-1.0431	3.4463	-0.30	0.764

Source: Authors' calculations using Stata 17

The coefficients on the lagged first differences of ln_inno are positive but statistically insignificant, indicating limited evidence of short-run persistence in innovation output. In contrast, D.c_gov enters negatively and is highly significant, implying that increases in public S&T budget allocation may exert a contractionary short-run effect on innovation growth. This finding may reflect implementation delays, transitional inefficiencies, and short-term adjustment costs associated with reallocating public resources. The interaction term D.Inter remains positive, suggesting that institutional quality continues to enhance the effectiveness of public spending even in the short run, although the estimated magnitude is comparatively small. Finally, the lagged differenced terms of D.ln_open are positive and significant, consistent with the view that openness can support short-run innovation performance through accelerated access to markets, technologies, and knowledge spillovers.

After examining both the long-run and short-run effects of the study variables, the study conducts a set of diagnostic tests to assess the adequacy and validity of the estimated model. Specifically, the Ramsey RESET test, the Breusch-Godfrey Serial Correlation LM test, and the White test.

Table 4.6. Summary of Model Diagnostic Tests

Diagnostic test	P-value	Conclusion
Ramsey RESET test	0.1527	Model is correctly specified
Serial Correlation LM test	0.7200	No evidence of serial correlation in the residuals.
White test	0.4377	No evidence of heteroskedasticity (constant error variance).

Source: Authors' compilation.

The diagnostic tests yield satisfactory results, indicating that the estimated model does not exhibit major econometric problems and that the empirical findings are statistically reliable.

V. Conclusion

The study aims to examine the impact of state budget expenditure on science and technology on innovation outcomes in Vietnam, in order to clearly identify the moderating role of institutional quality in this relationship. Using quarterly time-series data for the period of 2011 to 2025, the results indicate that state budget spending on science and technology does not automatically generate improvements in innovation outcomes when considered in isolation. By contrast, the effectiveness of public financial resources in promoting innovation depends largely on institutional quality, as evidenced by the positive and statistically significant effect of the interaction term between budgetary expenditure and institutional quality. This implies that institutions play a crucial role in the transformation of public financial resources into innovation outcomes.

In order to promote innovation, the state should first prioritize improving institutional quality in parallel with increasing budgetary investment in science and technology. Enhancing transparency, accountability, regulatory effectiveness, and the protection of intellectual property rights will help amplify the effectiveness of state budget capital and limit distortions in resource allocation. Second, policies on budgetary expenditure for science and technology should be implemented along a stable roadmap, closely linked to outcome-based evaluation mechanisms and commercialization potential, in order to minimize short-term adverse effects and harness long-term spillover effects.

In addition, the business sector needs to proactively invest in research and development (R&D) and strengthen linkages with research institutes, universities, and science and technology organizations in order to enhance its capacity to absorb and apply new technologies. At the same time, enterprises should pay greater attention to developing innovation activities and improving their ability to participate in global value chains, with appropriate policy support from the State. This will help firms adapt to the context of increasing international integration and intensifying competition better.

To extend the findings of this study, future research may consider examining the moderating role of more specific institutional factors, such as the quality of public governance, the degree of intellectual property rights protection or the effectiveness of law enforcement, in the relationship between state budget capital and innovation. In addition, the use of micro-level data at the firm or local level, as well as the application of alternative estimation methods to thoroughly address endogeneity issues, will help provide more comprehensive and robust evidence on the role of state budget funding in promoting innovation in Vietnam.

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