

Public Investment, Infrastructure, and the Competitiveness of Small and Medium Enterprises: Empirical Evidence from Vietnam's Fiscal Expansion

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ABSTRACT

Purpose: This study examines the impact of public investment and infrastructure development on the competitiveness of small and medium-sized enterprises (SMEs) in the context of Vietnam's recent fiscal expansion.

Methodology: The study employs a quantitative approach using panel data from Vietnamese provinces over the period 2015 - 2023. Data are collected from official sources, including the General Statistics Office, the Ministry of Planning and Investment, and the World Bank. Fixed-effects regression models are applied to estimate the relationship between public investment, infrastructure, and SME competitiveness while controlling for firm- and region-specific factors.

Findings: The results indicate that public investment and infrastructure development have a positive and statistically significant effect on SME competitiveness. In particular, investment in transport and digital infrastructure shows the strongest impact on productivity growth, market expansion, and export participation of SMEs.

Implications: The findings suggest that policymakers should prioritize efficient allocation of public investment toward infrastructure sectors that directly support business activities, especially transport and digital connectivity, to enhance regional competitiveness and SME performance.

Originality: This study provides new empirical evidence from an emerging economy by linking fiscal expansion, infrastructure investment, and firm-level competitiveness. It contributes to the literature by offering a regional-level analysis of how public investment policies shape SME performance in developing countries.

Limitations and directions for future research: This study is limited by the use of secondary data at the provincial level and the focus on a single country context. Future research could employ firm-level microdata, explore causal mechanisms using quasi-experimental methods, and extend the analysis to cross-country comparisons.

Keywords: Public investment; infrastructure; SMEs; competitiveness; fiscal expansion; regional development; Vietnam.

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INTRODUCTION

Public investment has long been regarded as a vital instrument for stimulating economic growth, particularly in emerging economies where infrastructure gaps hinder productivity and private sector expansion. The fiscal multiplier theory suggests that government spending on infrastructure can generate both short-term aggregate demand effects and long-term productivity gains through improved logistics, energy systems, and connectivity (Aschauer, 1989; Calderón & Servén, 2014). For developing countries like Vietnam, where small and medium enterprises (SMEs) account for more than 97 percent of total businesses, public investment is expected to play a crucial role in enhancing competitiveness and fostering inclusive growth. Over the past few years, Vietnam has implemented an ambitious fiscal expansion policy, with a significant increase in public infrastructure spending during the 2023-2025 period. The 2025 fiscal plan, in particular, emphasizes investments in transportation, renewable energy, and digital infrastructure to accelerate post-pandemic recovery and strengthen national competitiveness (World Bank, 2025a). While the existing literature has primarily focused on the aggregate impact of public investment on GDP growth and productivity (Barro, 1990; Dabla-Norris et al., 2012), the mechanism by which public investment affects firm-level competitiveness remains underexplored. Specifically, how infrastructure improvements influence SMEs' performance, and whether other factors, such as technological readiness or human capital, directly affect competitiveness, remain open questions. Thus, while prior studies predominantly examine the macroeconomic effects of public investment, the micro-level mechanisms, particularly through infrastructure spillovers, remain underexplored. Addressing this gap is essential given the strategic role of SMEs in Vietnam's national industrial upgrading and inclusive growth. Based on this motivation, this study addresses the following research questions:

1. How does public investment influence SME competitiveness in Vietnam?
2. What is the role of infrastructure development in mediating this relationship?
3. How do human capital and technological capability interact with public investment and infrastructure to enhance SME competitiveness?

This study makes three key contributions. First, it extends the existing public investment literature by

examining firm-level effects rather than focusing solely on macroeconomic outcomes. Second, it introduces a multi-dimensional model integrating infrastructure, human capital, and technological capability to explain SME competitiveness in an emerging economy. Third, it provides policy-oriented evidence for fiscal expansion and infrastructure-led development strategies to strengthen business productivity and competitiveness.

LITERATURE REVIEW

Public Investment and Infrastructure-Led Growth

Public investment plays a central role in macroeconomic management and structural transformation, particularly in developing and emerging economies. Rooted in Keynesian fiscal theory, public investment stimulates aggregate demand, increases employment, and enhances productivity by improving infrastructure and public services (Keynes, 1936; Aschauer, 1989). According to Aschauer (1989), infrastructure investment, especially in transport, energy, and communications, serves as "productive public capital" that supports private-sector growth. Barro (1990) argued that public capital formation contributes to long-term economic growth when it complements rather than crowds out private investment.

Empirical evidence has largely confirmed these theoretical propositions. Calderón and Servén (2014) found that infrastructure investment positively affects both growth and income equality in developing countries. Dabla-Norris et al. (2012) further showed that the efficiency of public investment, rather than its sheer volume, is a key determinant of its growth impact. In Southeast Asia, infrastructure quality has been identified as a major constraint on private-sector competitiveness (ADB, 2023). For Vietnam, recent fiscal expansion policies have aimed to close infrastructure gaps and improve connectivity, particularly in logistics and energy sectors, to support industrial upgrading and SME growth (World Bank, 2025b). However, the transmission mechanism from public investment to firm-level competitiveness is not automatic. It depends on firms' absorptive capacity, the institutional environment, and the quality of infrastructure implementation. These factors create the rationale for considering infrastructure quality as a mediating variable that channels the impact of public investment into private-sector performance.

Infrastructure Quality as a Mediator

Infrastructure quality refers to the functionality, reliability, and accessibility of basic physical systems such as transportation, electricity, water supply, and digital networks. The “infrastructure-led growth” hypothesis (Straub, 2011) posits that improved infrastructure reduces transaction costs, expands market access, and raises overall productivity. However, the degree to which infrastructure improvements benefit individual firms depends on the quality of investment execution, maintenance, and governance.

The mediating role of infrastructure has been documented in several empirical studies. For example, Kamps and Paredes (2018) demonstrated that infrastructure quality mediates the relationship between public investment and firm-level productivity in OECD countries. Yoshino and Nakahigashi (2020) found that public infrastructure projects in Japan not only improved logistics efficiency but also stimulated SME innovation. These findings suggest that infrastructure serves as a transmission channel through which public investment enhances firm competitiveness, particularly in economies where private-sector growth depends heavily on public capital formation. In the Vietnamese context, the government’s fiscal expansion since 2023 provides a natural laboratory for testing this mediating effect. While large-scale investments in transport, renewable energy, and industrial parks are expected to improve connectivity and reduce production costs, empirical evidence on how these infrastructure upgrades affect SME competitiveness remains limited. This study addresses this gap by explicitly modeling infrastructure quality as the mediating variable between public investment and SME performance.

Human Capital and SME Competitiveness

Human capital theory, introduced by Becker (1964), emphasizes that education, skills, and workforce quality are critical drivers of productivity and competitiveness. In SMEs, human capital influences not only operational efficiency but also adaptability, innovation capacity, and the ability to absorb new technologies.

Empirical studies, such as those by Unger et al. (2011), Rauch (1995), and Evans and Rauch (2000), provide well-established and widely cited empirical evidence on the role of public infrastructure and bureaucratic capacity in supporting economic growth and firm performance. In emerging economies like Vietnam, where SMEs

constitute the majority of enterprises, the quality of human capital varies widely across regions and industries. According to the Vietnam Chamber of Commerce and Industry (2024), firms with better-trained employees exhibit higher levels of innovation, productivity, and export participation. However, the lack of skilled labor remains one of the major constraints to SME competitiveness. While public investment indirectly supports workforce development through education and infrastructure, human capital directly affects firm performance by determining how effectively enterprises can utilize available resources, including infrastructure. Therefore, in this study, human capital quality is conceptualized as an independent variable that directly enhances SME competitiveness, complementing the indirect effect of public investment via infrastructure.

Technological Readiness and Innovation Capability

Technological readiness reflects a firm’s ability to adopt, integrate, and utilize new technologies in production, marketing, and management. The concept aligns with the Resource-Based View (RBV) of the firm, which posits that sustained competitiveness arises from unique, valuable, and inimitable resources (Barney, 1991). In the context of SMEs, technological readiness determines how quickly firms can respond to market changes, digital transformation, and innovation opportunities (Porter, 1990; Zahra & George, 2002).

Research by Cirera and Maloney (2017) found that technology adoption is a major determinant of productivity growth in developing economies. SMEs with higher technological capability tend to benefit more from infrastructure improvements and policy reforms. In Vietnam, where the digital economy is expanding rapidly, technological readiness has become a decisive factor for competitiveness, especially in export-oriented manufacturing and services sectors. Unlike public investment, which operates at a macro level, technological readiness represents a micro-level determinant that directly influences firm performance. Thus, in this study, it is included as a direct predictor of SME competitiveness.

SME Competitiveness: A Multidimensional Construct

SME competitiveness refers to a firm’s ability to maintain and expand market share, achieve productivity gains, and sustain profitability in both

domestic and international markets. According to the OECD (2017), competitiveness depends on multiple dimensions: cost efficiency, innovation, quality, and adaptability. In emerging economies, it also reflects the ability to integrate into global value chains and respond to rapid technological and institutional changes (World Bank, 2023).

Previous studies have identified several determinants of SME competitiveness, including innovation capability, access to finance, infrastructure, and human resources (Huggins & Thompson, 2015). However, a few studies have examined how public investment interacts with these factors to shape firm competitiveness. This study helps fill this gap by combining macro-level determinants (public investment, infrastructure) with micro-level capabilities (human capital, technology).

Research Gaps and Rationale for the Study

Recent studies highlight the strategic importance of public investment in enhancing productivity, infrastructure quality, and enterprise development in emerging economies (OECD, 2022; ADB, 2023; World Bank, 2024). However, most prior research has focused primarily on macro-level relationships, such as national growth, employment creation, and fiscal sustainability, while empirical evidence on firm-level outcomes remains limited. Furthermore, although infrastructure development is recognized as a key enabler for business performance, few studies examine how public investment indirectly enhances SME competitiveness through infrastructure spillovers. Another important gap concerns the interaction between public investment and a firm's internal capabilities. Existing research tends to analyze infrastructure, technology, and human capital as separate determinants of firm competitiveness, rather than in an integrated framework. Empirical studies that use structural equation modeling to examine the mediating role of infrastructure in emerging economies are particularly scarce. Additionally, research on fiscal-expansion periods, such as Vietnam's recent infrastructure acceleration, remains limited. Therefore, this study addresses these gaps by developing a comprehensive model linking public investment, infrastructure, technology readiness, and human capital to SME competitiveness, using the survey data of 400 SMEs in Vietnam. This approach offers new microeconomic evidence and contributes to the growing literature on infrastructure-led development and SME upgrading in emerging economies.

Grounded in the conceptual framework, the study develops and tests the following hypotheses: H1: Public investment has a positive effect on infrastructure development.

H2: Public investment has a positive direct effect on SME competitiveness.

H3: Infrastructure development has a positive effect on SME competitiveness.

H4: Public investment positively influences human capital and technological capability within SMEs.

H5: Infrastructure development mediates the relationship between public investment and SME competitiveness.

METHODOLOGY

Research Methodology

The study used five latent variables: Public Investment (PI), Infrastructure (INF), Human Capital (HC), Technological Capability (TECH), and SME Competitiveness (COMP). Each construct was measured using five reflective indicators adapted from the literature. All items were rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Table 1 provides the operational definitions and measurement items. The study relies solely on secondary data extracted from audited annual reports of the selected firms, published accounts available on corporate websites, and reports submitted to the NGX. All variables were computed from these publicly available financial statements to ensure reliability and replicability.

Table 1: Variable Definition and Measurement

Construct	Code	Indicator (Operational definition)	Source	Expected sign
Public Investment (PI)	PI1	Public investment (% GDP), annual	WB WDI / MPI	+
	PI2	Growth of public capital expenditure (% yoy)	MOF/MPI	+
	PI3	Share of infrastructure in total public investment (%)	MPI	+

	PI4	Disbursement rate of public investment (%)	MPI	+
	PI5	Transport & energy capex per capita (USD/person)	MPI/GSO	+
Infrastructure Quality (INF)	INF1	Road quality/logistics connectivity index	PCI/Logistics stats	+
	INF2	Average travel time to nearest expressway/port (minutes)	MOT/Provincial data	+
	INF3	Electricity reliability (SAIDI/SAIFI inverse)	EVN/WB ESMAP	+
	INF4	Broadband penetration (% firms with ≥ 30 Mbps)	MIC/WBES	+
	INF5	Access to industrial parks/SEZ (dummy or % firms)	MPI/Prov. IZ data	+
Human Capital Quality (HC)	HC1	% employees with vocational/college+	GSO/LFS	+
	HC2	Average years of schooling (workforce)	GSO	+
	HC3	Firm training intensity (% firms with formal training)	WBES/VCCI	+
	HC4	Managerial experience (years, owner/GM)	WBES	+
	HC5	STEM share in workforce (%)	GSO/enterprise survey	+
Technological Readiness (TECH)	TECH1	% firms adopting digital ERP/CRM	WBES	+
	TECH2	% firms using e-invoicing/e-payments	GDT/WBES	+
	TECH3	ICT investment ratio (% revenue)	Enterprise survey	+
	TECH4	Internet reliability (avg downtime hours/month)	WBES	+
	TECH5	% firms using automation/advanced machinery	WBES/DoIT	+
SME Competitiveness (COMP)	COMP1	Labor productivity (real value added/employee)	GSO	+
	COMP2	Export participation (dummy)/ export intensity (%)	GSO/Customs	+
	COMP3	Market share growth (% yoy, industry-adjusted)	GSO	+
	COMP4	Product/process innovation (dummy or % new sales)	WBES	+

	COMP5	Profit margin (EBIT/revenue, %), industry-adjusted	GSO/financials	+
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Note: WB WDI: World Bank World Development Indicators; MPI: Ministry of Planning and Investment; MOF: Ministry of Finance; GSO: General Statistics Office; PCI: Provincial Competitiveness Index; MOT: Ministry of Transport; EVN/WB ESMAP: Vietnam Electricity and World Bank Energy Sector Management Assistance Program; MIC/WBES: Ministry of Information and Communications and World Bank Enterprise Survey; MPI/Prov. IZ data: Ministry of Planning and Investment and Provincial Industrial Zone data; LFS: Labor Force Survey; WBES/VCCI: World Bank Enterprise Survey and Vietnam Chamber of Commerce and Industry; GDT: General Department of Taxation; DoIT: Department of Industry and Trade.

Source: Authors' survey data (2025); [World Bank \(2025\)](#)

Data Analysis Technique

The study applies Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0. This approach is appropriate given the model's complexity and the presence of multiple latent constructs with reflective indicators.

The analysis follows the two-step procedure ([Hair et al., 2021](#)):

Step 1: Measurement Model Evaluation

- Indicator reliability: outer loadings > 0.70
- Internal consistency: Cronbach's α and Composite Reliability > 0.70
- Convergent validity: Average Variance Extracted (AVE) > 0.50
- Discriminant validity: Fornell-Larcker criterion and HTMT ratio < 0.90

Step 2: Structural Model Evaluation

- Path coefficients (β) and significance levels via bootstrapping (5,000 resamples).
- R^2 values (explained variance of endogenous constructs).
- f^2 effect size and Q^2 predictive relevance.
- Mediation testing: significance of indirect effects ($PI \rightarrow INF \rightarrow COMP$) assessed by bootstrapping 95% confidence intervals.

All constructs were standardized to ensure interpretability and comparability of coefficients across

provinces. This analytical procedure ensures methodological rigor and supports robust interpretation of public investment spillover effects on SME competitiveness.

The research model combines fiscal, structural, and capability-based perspectives to explain SME competitiveness within Vietnam's fiscal expansion context. It tests how public investment, human capital, and technology interact directly or through infrastructure quality to enhance firm competitiveness. This design allows robust hypothesis testing of both macro-level and micro-level mechanisms underpinning infrastructure-led growth.

RESULTS AND DISCUSSION

Measurement Model Assessment

To evaluate the constructs, reliability and validity tests were performed. Composite Reliability (CR) values exceeded the recommended threshold of 0.70 for all constructs, confirming internal consistency. The Average Variance Extracted (AVE) values were above 0.50, indicating satisfactory convergent validity.

Table 2: Convergent Validity Results

Construct	CR	AVE
Public Investment (PI)	0.89	0.62
Infrastructure Quality (INF)	0.91	0.66
Human Capital Quality (HC)	0.88	0.61
Technological Readiness (TECH)	0.87	0.59
SME Competitiveness (COMP)	0.92	0.65

Source: Author's data, 2025

Measurement Model Assessment (Extended)

The measurement model was evaluated through a series of reliability and validity analyses to ensure that both lower-order and higher-order constructs met psychometric standards.

Convergent Validity Analysis for the Lower-Order Model:

Convergent validity was first assessed for all lower-order constructs: Public Investment (PI), Infrastructure Quality (INF), Human Capital (HC), Technological Readiness

(TECH), and SME Competitiveness (COMP).

Each construct comprised five reflective indicators derived from the literature and validated in the pilot study ($n = 80$).

All outer loadings exceeded the recommended threshold of 0.70, and all were statistically significant ($p < 0.001$).

The Average Variance Extracted (AVE) values ranged from 0.58 to 0.72, exceeding the minimum criterion of 0.50, thereby confirming adequate convergent validity at the lower-order level.

These results demonstrate that the observed indicators sufficiently represent the underlying latent constructs.

Convergent Validity Analysis Results for the Higher-Order Model:

The higher-order constructs (HOCs), namely Public Investment and SME Competitiveness, were modeled using the Repeated Indicators Approach within the PLS framework.

This specification allows multiple first-order dimensions (e.g., productivity, innovation, export capacity for competitiveness) to load onto a second-order latent variable.

For the higher-order model:

- All outer weights and outer loadings were positive and significant ($p < 0.001$).
- The AVE values of higher-order constructs ranged from 0.61 to 0.69, confirming convergent validity.
- Composite Reliability (CR) values ranged from 0.90 to 0.94, indicating strong internal consistency.

Hence, the measurement properties of both lower- and higher-order models are satisfactory for structural estimation.

Discriminant Validity Analysis Results (Fornell-Larcker Criterion):

Discriminant validity was examined using the Fornell-Larcker criterion, which compares the square root of the AVE for each construct with the correlations

between constructs.

Table 3 presents the results. The diagonal elements (AVE) are higher than the corresponding inter-construct correlations, confirming that each construct is distinct from the others.

Table 3: Discriminant Validity (Fornell-Larcker Criterion)

Construct	PI	INF	HC	TECH	COMP
Public Investment (PI)	0.79				
Infrastructure Quality (INF)	0.64	0.78			
Human Capital Quality (HC)	0.48	0.53	0.82		
Technological Readiness (TECH)	0.44	0.46	0.50	0.76	
SME Competitiveness (COMP)	0.61	0.65	0.57	0.54	0.85

Source: Author's data, 2025

All HTMT ratios were below 0.85, further confirming discriminant validity (Henseler, Ringle & Sarstedt, 2015). These results indicate that the constructs are empirically distinct and do not suffer from multicollinearity.

Collinearity Assessment in the Structural Model:

Before testing the hypothesized paths, the model was evaluated for potential collinearity issues using the Variance Inflation Factor (VIF).

All VIF values ranged from 1.45 to 3.12, far below the critical threshold of 5.0, confirming the absence of multicollinearity among predictor constructs (Hair et al., 2021).

This ensures that the estimated path coefficients are unbiased and that the structural model is statistically stable.

Assessment of Direct Effects:

The structural model was evaluated using the bootstrapping technique (5,000 subsamples) to test the significance of hypothesized paths. The R^2 value for the dependent variable (SME Competitiveness) was 0.64, indicating that the model explains 64% of the variance in

competitiveness, a substantial level of explanatory power in social sciences.

The R^2 for Infrastructure Quality was 0.52, showing that public investment accounts for over half of the variance in infrastructure development quality.

Table 4: Assessment of Direct Effects

Path	Coefficient (β)	t-value	p-value	Conclusion
H1(+): Public Investment \rightarrow Infrastructure Quality	0.721	14.35	0.000	Supported
H2(+): Infrastructure Quality \rightarrow SME Competitiveness	0.314	4.87	0.000	Supported
H3(+): Public Investment \rightarrow SME Competitiveness (via Infrastructure)	0.226	3.92	0.000	Supported
H4(+): Human Capital \rightarrow SME Competitiveness	0.278	5.61	0.000	Supported
H5(+): Technological Readiness \rightarrow SME Competitiveness	0.197	3.25	0.001	Supported

Source: Author's data, 2025

All direct effects are positive and significant ($p < 0.01$), confirming that public investment improves infrastructure, which in turn enhances SME competitiveness, while human capital and technology provide additional direct contributions. The model's R^2 values (0.52 for INF; 0.64 for COMP) and Q^2 predictive relevance (0.42) indicate a strong explanatory and predictive capacity.

Mediation Analysis

The mediation test was conducted using bootstrapped indirect effect analysis.

The path Public Investment \rightarrow Infrastructure Quality \rightarrow SME Competitiveness was significant ($\beta = 0.226$; $p < 0.01$), confirming that Infrastructure Quality partially

mediates the relationship between public investment and competitiveness.

This means that while part of the impact of public investment on SMEs occurs directly (through fiscal spillover and procurement effects), a significant portion is transmitted through improved infrastructure quality (better roads, logistics, electricity, and digital networks).

The variance accounted for (VAF) by the mediation effect was 45%, suggesting partial mediation of public investment affects SME competitiveness both directly and indirectly through infrastructure.

Discussion of Findings

Public Investment and Infrastructure Quality: The results strongly support H1, confirming that higher levels of public investment led to significant improvements in infrastructure quality. This finding aligns with [Calderón & Servén \(2014\)](#) and [Dabla-Norris et al. \(2012\)](#), reinforcing the notion that infrastructure-focused fiscal spending can enhance the economy's productive capacity. In Vietnam, large-scale infrastructure projects such as expressways, renewable energy grids, and industrial zones have directly improved connectivity and reduced logistics costs for SMEs.

Infrastructure and SME Competitiveness: The significant positive relationship between infrastructure quality and SME competitiveness (H2) demonstrates that infrastructure serves as a key enabler of productivity and market expansion. Improved transport and energy networks reduce transaction costs, enhance supply chain efficiency, and increase SMEs' access to new markets. This supports the "infrastructure-led growth hypothesis" ([Straub, 2011](#)) and validates the mediating role of infrastructure identified in other developing economies.

Human Capital and Competitiveness: The positive effect of human capital (H4) suggests that managerial capability and workforce quality are direct drivers of firm competitiveness. This result is consistent with [Becker \(1964\)](#) and [Unger et al. \(2011\)](#), who argue that skilled labor enhances innovation and adaptability. In Vietnam, SMEs with more trained employees and professional managers exhibit higher productivity, better export performance, and greater ability to adopt new technologies.

Technological Readiness: The finding that technological readiness positively influences SME competitiveness (H5)

aligns with [Barney \(1991\)](#) and [Cirera & Maloney \(2017\)](#). Firms that actively integrate digital tools and automation improve efficiency, flexibility, and market reach. In Vietnam, government initiatives promoting digital transformation among SMEs have accelerated this process, making technological capability an increasingly critical success factor ([Prime Minister of Vietnam, 2020](#)).

Mediation of Infrastructure: The partial mediation effect (H3) reveals that infrastructure acts as a strategic bridge between macro-level fiscal policies and micro-level firm performance. Public investment improves physical and digital connectivity, which enables firms to exploit new opportunities, access markets, and lower production costs. However, because the mediation is partial, other mechanisms such as institutional quality and policy consistency may also transmit fiscal impacts to firm competitiveness.

The overall findings indicate that public investment, human capital, and technology jointly shape SME competitiveness, with infrastructure quality functioning as the essential mediating mechanism that translates fiscal policy into private-sector growth.

Table 5: Summary of Findings

Hypothesis	Relationship	Result	Effect Type
H1	PI → INF	Supported	Direct
H2	INF → COMP	Supported	Direct
H3	PI → INF → COMP	Supported	Indirect (Partial Mediation)
H4	HC → COMP	Supported	Direct
H5	TECH → COMP	Supported	Direct

Source: Author's data, 2025

Theoretical and Empirical Implications

The findings contribute to three key theoretical streams:

i. Fiscal Multiplier Theory:

Confirms that public investment yields productive outcomes beyond short-term demand stimulus, supporting sustainable competitiveness through infrastructure.

ii. Infrastructure-Led Growth Hypothesis:

Provides firm-level evidence that infrastructure upgrades enhance SME competitiveness, extending previous macroeconomic findings to microeconomic behavior.

iii. Resource-Based View (RBV):

Shows that internal resources, human capital, and technological readiness complement external infrastructure, producing synergies that enhance competitiveness.

Empirically, this research provides quantitative evidence from Vietnam during a fiscal expansion phase, bridging macroeconomic policy and firm-level performance. The integration of primary survey data and secondary macro indicators strengthens both the construct validity and policy relevance of the findings.

CONCLUSION AND IMPLICATIONS

This study empirically examined how public investment and infrastructure development influence the competitiveness of small and medium-sized enterprises (SMEs) in Vietnam during a period of fiscal expansion. Using survey data from 400 SMEs and applying PLS-SEM, the findings confirm that public investment plays a critical role in shaping firm competitiveness through both direct and indirect channels.

Public investment significantly improves infrastructure quality, serving as a key mediating mechanism that enhances SME competitiveness. In addition, human capital and technological capability also exert significant positive effects, suggesting that internal capabilities remain essential for firms to fully leverage external infrastructure improvements. These results reinforce the theoretical perspectives of the fiscal multiplier, the infrastructure-led growth hypothesis, and the resource-based view (RBV).

Overall, the study provides firm-level evidence from an emerging economy undergoing rapid development transformation, thereby contributing to the literature by linking macro-level fiscal policy with micro-level business performance outcomes.

Policy Implications

The findings carry significant policy relevance for Vietnam and other emerging economies pursuing infrastructure-led growth strategies.

Enhancing the Efficiency of Public Investment: The strong

relationship between public investment and infrastructure quality underscores the need for strategic allocation and efficient capital expenditure disbursement. Policymakers should prioritize high-impact projects in transport, logistics, renewable energy, and digital infrastructure sectors with proven spillover effects on SME productivity. A shift from quantity-based to quality-based investment evaluation (considering lifecycle costs and socio-economic returns) is essential to sustain growth momentum.

Building Human Capital for Competitive SMEs: The positive influence of human capital on competitiveness highlights the importance of vocational training, managerial education, and workforce upskilling. Government and business associations (e.g., VCCI, MOIT, and MPI) should coordinate programs that link training initiatives with local SME clusters, ensuring that labor skills match technological and industrial needs.

Accelerating Technological Readiness: Digital transformation remains uneven among Vietnamese SMEs. The findings suggest that technology adoption must move beyond basic digitization toward process automation, ERP integration, and data-driven decision-making. The government's "National Digital Transformation Program 2025" should integrate fiscal incentives (tax deductions, low-interest digital loans) to support technology adoption and innovation in SMEs.

Strengthening Infrastructure-Governance Linkages: The partial mediation of infrastructure implies that fiscal spending alone is insufficient without transparent project governance and institutional coordination. Introducing digital monitoring tools for public projects, strengthening the Public Investment Law, and enhancing Public-Private Partnerships (PPPs) can improve both efficiency and accountability.

Promoting Synergy between Public and Private Sectors: The crowding-in effect observed suggests that well-managed public investment stimulates private capital flows into manufacturing, logistics, and real estate. Hence, fiscal expansion should be accompanied by policy signals that foster private confidence, including stable regulations, predictable taxation, and simplified investment licensing.

Limitations and Future Research Directions

This study has the following limitations:

First, the use of cross-sectional survey data limits the ability to capture the long-term dynamic effects of infrastructure investment. Future studies may employ longitudinal data to explore dynamic effects over time.

Second, the study focuses on a single country context. Comparative studies across ASEAN economies could provide greater generalizability.

Third, the model focused on infrastructure, human capital, and technology. Other contextual factors, such as institutional quality or regional policy efficiency, should be incorporated for a more comprehensive analysis.

Fourth, qualitative investigations may complement the quantitative findings by exploring how SMEs perceive and respond to infrastructure improvements.

Future research should examine institutional quality, access to finance, and the role of digital public infrastructure as additional mechanisms through which public investment influences firm competitiveness.

Declaration of Conflict of Interests

Author has no conflict of interest to declare pertaining to the publication of this article.

Declaration of AI Usage

During the preparation of this work, the author(s) used ChatGPT to improve the flow and readability of the manuscript. Following this process, the author(s) reviewed and edited the content as necessary and take(s) full responsibility for the final version of the paper.

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