

The Critical Factors Contributing to Private Sector's Behavioral Intention: A Case Study of Vietnam Construction Public-Private Partnership Projects

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Received: 9 May 2025 | Revised: 5 July 2025 and 15 July 2025 | Accepted: 19 July 2025

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ABSTRACT

This study investigates the key factors influencing the private sector's intention to participate in Public-Private Partnership (PPP) infrastructure projects in Vietnam. Grounded in the Theory of Planned Behavior (TPB), the research integrates Attitude towards Behavior (AB), Subjective Norms (SN), Perceived Behavioral Control (PBC), Government Influence (GI), and Risk Perception (RP) to assess Behavioral Intention (BI). A mixed-method approach was adopted, combining Delphi expert consultation and a survey of 120 professionals, analyzed using Structural Equation Modeling (SEM). The results reveal that GI, PBC, and RP have the strongest impact on intention, while AB and SN are also significant. The model explains 75.9% of the variance in BI. These findings underscore the importance of institutional frameworks, capacity support, and effective risk management in fostering private investment in PPPs, contributing to the behavioral understanding of PPP participation, and providing actionable policy insights for infrastructure development in emerging economies.

Keywords-private sector's behavioral intention; public-private partnership; theory of planned behavior; structural equation modeling

I. INTRODUCTION

Public-Private Partnerships (PPPs) have emerged worldwide as a strategic mechanism to mobilize private sector investment for public infrastructure development. By combining the strengths of both public and private actors, PPPs enable the delivery of projects that are more efficient, sustainable, and cost-effective [1]. In developing countries, including Vietnam, PPPs are becoming increasingly critical due to fiscal constraints and growing infrastructure demands.

Between 2021 and 2030, Vietnam's infrastructure needs are projected to exceed USD 100 billion, particularly in the areas of transportation, energy, and urban infrastructure [2]. However, public budget limitations have made it necessary to explore alternative financing mechanisms, with PPPs recognized as one of the most promising approaches. Despite the establishment of a legal foundation through Law No. 64/2020/QH14 on PPP, actual private sector participation has remained below expectations. Several challenges have contributed to this hesitation, including unclear risk-sharing mechanisms, inconsistent government support, limited financial viability, and a regulatory environment that is not

always perceived as investor-friendly [3]. Beyond such institutional and financial barriers, behavioral factors also play a critical role. According to the Theory of Planned Behavior (TPB), subjective constructs such as Perceived Behavioral Control (PBC), attitudes toward PPPs, and social norms shape investment intentions [4].

While existing global research has explored determinants of private sector participation in PPP projects, much of it focuses on individual dimensions, such as risk management [5, 6], critical success factors, delivery method selection [7], or implementation challenges, without integrating them into a comprehensive analytical framework. Moreover, relatively few studies employ behavioral theory to systematically validate and rank influencing factors using both expert consultation and empirical evidence.

In Vietnam, prior studies have addressed issues such as risk allocation, investor engagement, and project management in PPPs, often using qualitative or quantitative approaches. However, the specific Behavioral Intention (BI) of the private sector to invest in PPP projects has not been adequately investigated in the Vietnamese context.

To fill this gap, this study applies the TPB in combination with Structural Equation Modeling (SEM) to examine the drivers of private sector participation in PPP infrastructure projects. The findings aim to provide both theoretical insights and practical policy recommendations to strengthen PPP implementation in emerging economies.

II. LITERATURE REVIEW

PPPs have been implemented globally in various sectors, including transportation, energy, water, and healthcare [1]. In Vietnam, PPPs are prioritized to address infrastructure financing gaps, particularly in transportation, renewable energy, and urban development. To enhance participation, the government has introduced frameworks such as Law No. 64/2020/QH14, which standardizes procurement, clarifies risk allocation, and provides investment incentives. Nonetheless, the number of successful PPP projects remains low, constrained by ambiguous legal interpretations, inadequate risk-sharing, weak project preparation, and insufficient investor protection [8]. This highlights the need to identify and understand the critical factors that shape private sector participation.

Previous studies indicate that both institutional and behavioral drivers influence investment intention. Authors in [9] emphasized legal clarity, transparent procurement, and financial feasibility as prerequisites for attracting investors. Similarly, authors in [10] stressed well-defined risk-sharing and predictable returns, while authors in [5] highlighted governance and mutual trust as central to investor confidence. In a comparative analysis, authors in [11] found that administrative complexity and lack of transparency discouraged private participation, particularly in developing countries such as China. Moreover, authors in [12] reinforced the significance of institutional support and long-term collaboration as key motivators, whereas authors in [13] showed that perceived risk significantly affects willingness to engage. Collectively, these studies suggest that private sector participation depends not only on economic rationality but also on perceptions of trust, risk, and control, underscoring the relevance of behavioral models such as the TPB.

The TPB, developed in [4], posits that BI is driven by three core constructs: Attitude towards Behavior (AB), Subjective Norms (SNs), and PBC. In PPPs, AB reflects investors' evaluation of participation based on profitability, innovation potential, administrative burden, and reputational risk. SNs capture perceived social pressures from stakeholders such as business partners, industry associations, and policymakers, while PBC relates to the perceived ease of engagement, shaped by access to finance, managerial capacity, regulatory familiarity, and dispute resolution confidence. Importantly, even favorable attitudes and norms may fail to translate into participation when PBC is low.

TPB is regarded as one of the strongest and most accurate predictive tools in research on individual behavior. It has been extensively applied across various domains, including low-carbon tourism [14], green infrastructure adoption [15], information technology [16], nuclear facility participation [17], food waste classification [18], and construction waste

management [19], demonstrating its robustness as a predictive framework.

Recent empirical studies have further validated the applicability of TPB in PPP investment decision-making. Authors in [20] identified AB, SN, Risk Perception (RP), and PBC as key factors influencing public participation in China's PPPs, while perceived benefit had a limited influence. In the UK and UAE, authors in [21] developed a TPB-based model, highlighting that government support and institutional stability strongly influence BI. Likewise, authors in [22] emphasized that SN, particularly peer influence, and RP significantly shaped private sector decision-making in China's PPP market. Similarly, risk identification, allocation, and management remain decisive in shaping investment decisions. Proper risk-sharing arrangements encourage private sector engagement, whereas inappropriate or unclear allocation significantly reduces project attractiveness [23]. This challenge is particularly salient in Vietnam, where risk distribution has often been cited as a persistent barrier to PPP success [9].

To test such complex relationships, SEM is particularly effective, allowing simultaneous estimation of multiple interdependent relationships between observed and latent variables, making it well-suited for validating TPB constructs in PPP research [24]. Previous applications of SEM in infrastructure studies include assessments of project success factors, stakeholder satisfaction, and risk dynamics.

III. METHODOLOGY

A. Research Framework

While the original TPB framework comprises three psychological constructs: AB, SN, and PBC, this study extends the model by incorporating two additional contextual variables: Government Influence (GI) and RP. These extensions reflect insights from the Vietnamese PPP context, enhancing the explanatory power of the TPB model and reflecting the complex decision-making environment faced by private investors in emerging economies. As these latent constructs are not directly observable, a comprehensive literature review and Delphi expert consultation were employed to identify measurable indicators for each variable. The proposed research model is depicted in Figure 2.

B. Research Design

The study employs a structured five-phase research design that progresses systematically from theoretical model development to empirical validation using SEM. The inputs, processes, and expected outputs for each phase are summarized in Table I.

1) Literature Review

The first step to determine the critical factors influencing private sector participation in PPP projects included a comprehensive review of scholarly publications from databases such as Scopus, Web of Science, and Google Scholar was conducted to extract factors influencing PPP participation.

2) Applying the Delphi Method

To ensure contextual relevance and theoretical consistency, the Delphi method was applied to validate the critical factors found in the literature. While authors in [25] did not prescribe a specific number of experts for Delphi applications, authors in [26] recommended at least 8-10, while in [27] it was noted that most Delphi studies involve 8-16 participants, with a minimum of 8 being sufficient for reliability. Adhering to these recommendations, this study engaged a panel of 10 experts, comprising private sector executives, PPP policymakers, and academic researchers. They reviewed the clarity, completeness, and relevance of the proposed variables, providing feedback for refinement. The responses were predominantly positive, requiring only minor adjustments to wording.

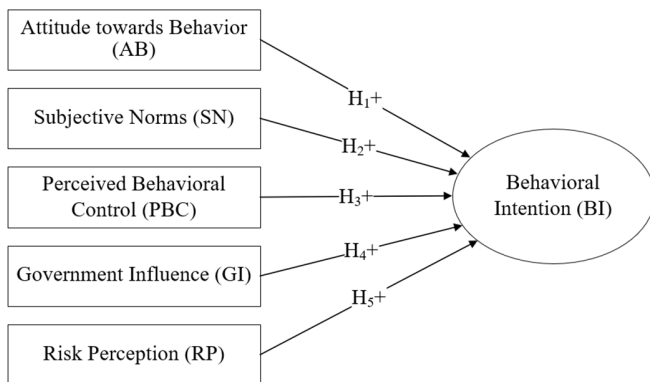


Fig. 1. TPB model.

TABLE I. RESEARCH DESIGN

No.	Steps	Input	Output
1	Literature review	Prior research, TPB theory, PPP studies	Key factors and criteria identified
2	Delphi application	Expert feedback	Conceptual model and hypotheses, validated questionnaire
3	Sampling and data collection	Purposive + snowball sampling, survey	Dataset from private sector
4	Data cleaning & preprocessing	Raw data	Clean dataset ready for SEM
5	SEM (CFA* & structural analysis)	Model + clean data	Validated model, significant factors

*Confirmatory Factor Analysis (CFA)

3) Data Sampling

As SEM is sensitive to sample size, adequacy was carefully considered. The recommendation of a minimum of 100 cases for valid SEM estimation in [28] guided our sampling strategy.

The study targeted professionals and decision-makers in the Vietnamese private sector with direct experience or interest in PPP participation. Respondents included senior managers and project directors from both domestic and foreign construction companies operating in Vietnam.

Data was collected via online surveys, where participants rated each measurement item using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The 5-point scale was selected due to its extensive application in behavioral research

and its demonstrated reliability in capturing consistent attitudinal and perceptual measures [29].

4) Data Cleaning and Preprocessing

The survey data underwent a rigorous preprocessing and cleaning procedure. First, all questionnaires were systematically screened, and incomplete responses, straight-line patterns, and inconsistent answers were excluded. Next, missing values were carefully assessed and addressed, while extreme outliers were identified and removed to minimize potential bias. The refined dataset was then coded and subjected to preliminary reliability and validity checks to ensure the internal consistency of the measurement scales.

5) Model Evaluation

This study followed the two-step approach, as in [30]. First, the measurement model was evaluated to assess construct reliability and validity. Confirmatory Factor Analysis (CFA) was then conducted to determine whether observed variables loaded significantly onto their intended latent factors, as recommended in [31]. Constructs were considered valid if the factor loadings were significant and aligned with theoretical expectations.

IV. RESULTS AND DISCUSSION

A. Identification of Critical Factors

Following an extensive literature review and the consensus reached with the 10 experts, six critical factors and their corresponding observable indicators were finalized for empirical validation, summarized in Table II.

B. Descriptive Statistics

A total of 120 valid responses were collected from Vietnamese private sector participants with experience or interest in PPP infrastructure projects. The demographic and background data of the respondents are revealed in Table III.

The distribution demonstrates both depth and breadth of expertise. Notably, the dominance of senior managers (60.83%) enhances the reliability of behavioral assessments, given their strategic decision-making roles. The inclusion of respondents from both domestic (63.33%) and foreign enterprises (36.67%) further enriches the dataset, allowing for comparative insights into how different organizational backgrounds perceive Vietnam’s PPP environment.

C. Measurement Reliability and Validity

Prior to Partial Least Squares (PLS)-SEM implementation, the reliability and validity of the data were evaluated. Cronbach’s α values, computed using SPSS 20.0 software, ranged between 0.822 and 0.910, surpassing the minimum threshold of 0.7 [50] and confirming strong internal consistency.

Validity was subsequently assessed with Amos 21.0 through Average Variance Extracted (AVE) and Composite Reliability (CRE). In this study, all AVE values exceeded 0.5 and all CRE values were above 0.822, confirming satisfactory convergent validity and construct reliability, based on the AVE

≥ 0.5 and $CR_e \geq 0.6$ thresholds established in [51]. These results are shown in Table IV.

TABLE II. CRITICAL FACTORS AFFECTING THE PRIVATE SECTOR'S INTENTION TO CONSTRUCT PPP PROJECTS

Code	Variables	Indicator Description	Source
I			
AB			
AB1	Profitability	Participation in PPP projects increases operational benefits	[22, 23]
AB2	Market Access	Participation in PPP projects offers access to infrastructure and public service markets	[22, 32]
AB3	Market Share	Participation in PPP projects helps expand the company's market share	[33, 34]
AB4	Political Privileges	Participation in PPP projects may grant political advantages	[35]
AB5	Reputation and Social Image	Participation in PPP projects enhances company reputation and public image	[22]
II			
SN			
SN1	Competitor Attitude	Competitors actively and positively engage in PPP projects	[22, 23]
SN2	Government Encouragement	Government policies encourage private PPP project involvement	[36, 37]
SN3	Industry Support	Industry associations support PPP project participation	[24, 38]
SN4	Financial Sector Support	Financial institutions support PPP project involvement	[22]
III			
PBC			
PCB 1	Financial Capability	The firm has sufficient financial resources for PPP projects	[9, 39, 40]
PCB 2	Technical Capacity	The firm possesses the required technical expertise	[36, 41]
PCB 3	Prior Experience	The firm has prior experience in PPP project implementation	[42, 43]
PCB 4	Borrowing Capacity	The firm can secure funding from financial institutions	[22]
PCB 5	Government Relations	The firm maintains a strong relationship with public authorities	[44]
IV			
GI			
GI1	Fair Competition	Government ensures a competitive PPP environment	[37, 45]
GI2	Legal Framework	Clear policies and legislation support PPP development	[36, 40, 46, 47]
GI3	Contract Compliance	Government honors PPP contractual obligations	[9, 36, 40, 41]
GI4	Financial Support	Government provides financial incentives to investors	[9, 12, 48]
GI5	Coordination Role	Government facilitates cooperation with financial institutions	[36, 37]
V			
RP			
RP1	Risk Allocation	PPP risks are fairly allocated between the public and private sectors	[9, 10, 49]
RP2	Revenue Risk Sharing	Revenue fluctuations are equitably shared between public and private sectors in PPP projects	[20]
VI			
BI of private sector			
BI1	Participation Willingness	Willingness to gradually engage in PPP projects	[20]
BI2	Business Expansion	Willingness to increase PPP share in business portfolio	[20]
BI3	PPP Preference	Preference for PPP over traditional projects	[20]
BI4	Recommend Others	Willingness to recommend PPP to partners	[20]

D. Confirmatory Factor Analysis (CFA)

CFA was conducted to validate the measurement model. Multiple fit indices were used in this process, confirming that the model is statistically robust and effectively represents the relationships between constructs and their indicators, presented in Table V.

TABLE III. RESPONDENTS' INFORMATION

Categories	Items	Frequency	Percentage (%)
Working Experience	From 5 - 10 years	80	66.67
	From 10 - 15 years	18	15
	More than 15 years	22	18.33
Experience in PPP infrastructure projects	Less than 3 years	39	32.5
	From 3 - 5 years	34	28.3
	Not yet	25	20.83
	More than 5 years	22	18.33
Job Position	Senior Manager	73	60.83
	Functional Manager	47	39.17
Company Type	Domestic Enterprises	76	63.33
	Foreign Enterprises	44	36.67

TABLE IV. RELIABILITY MEASUREMENT

Variables	No. of Items	Cronbach' α	CR _e	AVE
AB	5	0.857	0.865	0.563
SN	4	0.829	0.837	0.563
PBC	5	0.834	0.838	0.512
GI	5	0.91	0.912	0.674
RP	2	0.822	0.822	0.698
BI	4	0.872	0.874	0.634

TABLE V. MODEL FIT MEASURES

Fit Index	Value	Threshold	Evaluation
Chi-square/df	1.276	< 3.00	Excellent
RMSEA	0.048	< 0.08	Good fit
CFI	0.956	> 0.90	Excellent
TLI	0.949	> 0.90	Excellent
GFI	0.829	> 0.80	Acceptable
SRMR	0.051	< 0.08	Good
PCLOSE	0.566	> 0.05	Close fit

Root Mean Squared Error of Approximation (RMSEA), Comparative Fit Index (CFI), Comparative Fit Index; Tucker-Lewis Index (TLI), Goodness of Fit Index (GFI), Standardized Root Mean Square Residual (SRMR), P value of close fit (PCLOSE)

E. Structural Equation Modeling (SEM)

Since the structural model builds upon the validated measurement model, the overall model fit indices remained consistent between CFA and SEM. SEM was then applied to test the hypothesized relationships among latent variables. Figure 3 illustrates the structural model results. Each path corresponds to a specific hypothesis, with five standardized regression weights (β) indicating the strength of the relationships. Hypotheses were tested by evaluating the Critical Ratio (CR) and p-values. A CR above 1.96 and a p-value below 0.05 indicate statistical significance at the 0.05 level. Table VI summarizes the hypothesis testing results.

The SEM analysis confirmed that all hypothesized relationships (H1-H5) were statistically significant ($p < 0.05$). Among the predictors, GI ($\beta = 0.269$) and PBC ($\beta = 0.264$) exhibited the strongest positive effects on BI, highlighting the critical role of institutional support and organizational capability. RP ($\beta = 0.263$) also exerted a substantial effect,

underscoring the importance of risk-sharing mechanisms in fostering private participation. Although AB ($\beta = 0.175$) and SN ($\beta = 0.192$) showed comparatively lower effects, both remained significant, confirming the influence of personal beliefs and social expectations. The model explained 75.9% of

the variance in BI (Coefficient of determination, $R^2 = 0.759$), indicating high explanatory power. Moreover, inter-construct correlations were positive and statistically significant, such as between GI and RP (Pearson correlation coefficient, $r = 0.662$) and between AB and GI ($r = 0.422$).

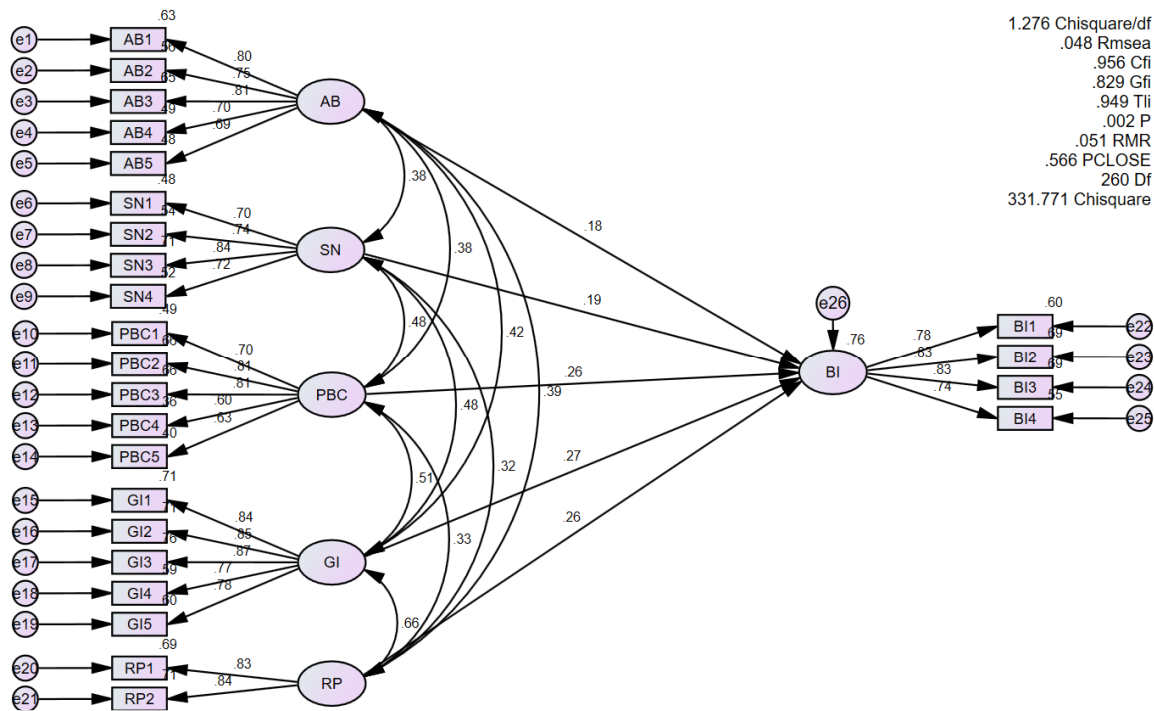


Fig. 2. Structural model with path coefficients (β).

TABLE VI. HYPOTHESIS TESTING RESULTS

Hypothesis	Path	β	CR	p-value	Results
H1	AB \rightarrow BI	0.175	2.229	0.026	Supported
H2	SN \rightarrow BI	0.192	2.239	0.025	Supported
H3	PBC \rightarrow BI	0.264	2.942	0.003	Supported
H4	GI \rightarrow BI	0.269	2.471	0.013	Supported
H5	RP \rightarrow BI	0.263	2.579	0.01	Supported

F. Discussion

This study offers valuable insights into the determinants of private sector BI to engage in PPP infrastructure projects in Vietnam.

First, the strong influence of PBC and GI indicates that private sector confidence and supportive institutional frameworks are key drivers of participation intent. In Vietnam, PPPs are vital for infrastructure development, particularly in transport, energy, and urban sectors, yet institutional and procedural barriers persist. According to the Asian Development Bank (ADB) [52], challenges remain in legal enforcement, risk allocation, and standardized procurement. Although Law No. 64/2020/QH14 provides a legal basis, its application is inconsistent across ministries and provinces, creating uncertainty for private investors, especially international ones. Moreover, many domestic firms face limitations in capital, legal expertise, and technical capacity,

further underscoring the significance of PBC and GI. These findings align with prior studies [5, 53] that emphasize the role of institutional support and self-efficacy in shaping PPP participation in emerging markets, reinforcing the TPB’s cross-contextual validity.

Second, the significant impact of RP on BI underscores the critical role of risk management in PPPs. This finding supports the authors in [10], who identified risk allocation and clarity as primary concerns of the private sector in PPP arrangements. Unlike studies treating RP as an indirect factor, our results demonstrate a direct and statistically robust effect, emphasizing its practical relevance in Vietnam’s PPP context. Despite the PP Law’s efforts to standardize project selection, bidding, risk-sharing, and revenue mechanisms, institutional risks persist. Key challenges include the absence of detailed secondary legislation, vague risk-sharing provisions, and limited responsiveness from authorities. The ADB [52] also highlights inconsistent guidance from ministries and limited local capacity in implementing PPP frameworks. Although instruments such as government guarantees and viability gap funding have been introduced, unclear access procedures reduce their effectiveness. Further concerns remain regarding contract enforcement, dispute resolution, and administrative delays, all of which diminish investor confidence.

Third, while AB and SN exert relatively weaker influence, they remain statistically significant. This finding aligns with the study in [9], where it is noted that individual perceptions and social pressures, though secondary, reinforce private investment decisions. Our results suggest that these psychological factors are particularly important for fostering long-term cultural readiness for PPP collaboration, even if they are not the primary motivators of immediate investment decisions.

While the general notion that institutional support and risk-sharing influence investment may appear intuitive, this study contributes novel empirical evidence by quantifying the relative impact of each factor through a robust SEM-TPB framework. The findings reveal that GI, PBC, and RP are not just relevant but statistically dominant predictors of BI. Overall, the model's ability to explain 75.9% of the variance in BI demonstrates its strong explanatory power and confirms the value of integrating both institutional and psychological dimensions.

V. CONCLUSION

This study investigated the critical factors influencing the private sector's Behavioral Intention (BI) toward participating in Vietnam's construction Public-Private Partnership (PPP) projects. The empirical results confirmed that Government Influence (GI), Perceived Behavioral Control (PBC), and Risk Perception (RP) significantly shape BI.

The findings have both theoretical and practical contributions. Theoretically, the research extends the application of the Theory of Planned Behavior (TPB) within the unique context of Vietnam's PPP projects, specifically highlighting the critical interplay of risk-related and institutional factors. While certain results corroborate with established understanding, their empirical validation and specific contextual relevance within Vietnam's rapidly evolving PPP landscape underscore the distinct value and necessity of this investigation. Practically, these findings provide invaluable, evidence-based guidance for policymakers, project sponsors, and government agencies.

Nevertheless, the study has limitations. The dataset, while including both domestic and international respondents, is limited to Vietnam, potentially restricting generalizability to other emerging or developed economies. Future research should expand the model by incorporating additional determinants, such as cultural or sector-specific factors, and conducting cross-country or cross-sectoral comparisons to improve applicability and enrich PPP development strategies globally.

ACKNOWLEDGMENT

This research is part of Project Grant No. KHTĐ2432, funded by the University of Transport Ho Chi Minh City. The authors gratefully acknowledge the financial support. The opinions expressed are solely those of the authors and do not necessarily reflect those of the sponsor.

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