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TRAN TUAN PHONG

**RESEARCH ON PUBLIC INVESTMENT CAPITAL
MANAGEMENT FOR TRANSPORT INFRASTRUCTURE
CONSTRUCTION IN VIETNAM**

SUMMARY OF DOCTORAL DISSERTATION

**Major: Construction Management
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Assoc. Prof. Dr. Nguyen Luong Hai

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Academic Supervisor: Assoc. Prof. Dr. Nguyễn Lương Hải

Reviewer 1:

Reviewer 2:

Reviewer 3:

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INTRODUCTION

1. Rationale for the Research

Public investment in the transport sector plays a vital role in socioeconomic development. During the 2021–2025 period, the National Assembly and the Government allocated approximately VND 470 trillion from the state budget to transport infrastructure development, of which the Ministry of Construction was assigned to manage approximately VND 379,402 billion. By the end of 2025, the country achieved its target of having over 3,000 km of expressways.

However, the management of public investment capital (Public Investment Capital) for transport infrastructure construction has revealed significant shortcomings: the disbursement rate by October 2025 reached only 54.2%; during 2016–2020, losses and waste amounted to VND 31,795 billion; and PPP capital mobilization achieved only 27% of the plan. These deficiencies reflect systemic weaknesses across the various dimensions of Public Investment Capital management.

From a scientific perspective, the majority of prior studies have approached the subject from legal and budgetary perspectives, without applying modern management science to analyze managerial behavior and causal relationships. No validated quantitative measurement framework has been established, nor has the causal structure linking management activities to outcomes been determined. Accordingly, the author selected the research topic: "Research on Public Investment Capital Management for Transport Infrastructure Construction in Vietnam".

2. Research Objectives

To develop and empirically validate a comprehensive measurement and analytical model of public investment capital management activities based on modern management science principles, adapted to the Vietnamese context; and to propose evidence-based management implications prioritized according to empirical findings to enhance the effectiveness of public investment in transport infrastructure construction.

3. Research Subject and Scope

a. Research Subject

The management activities of public investment capital in transport infrastructure construction in Vietnam, encompassing five groups of

activities: (1) capital planning; (2) organizing capital plan implementation; (3) directing capital plan implementation; (4) controlling capital plan implementation; (5) coordination among public investment capital management stakeholders.

b. Research Scope

- Content scope: five Public Investment Capital management activities within the framework of medium-term and annual public investment plans pursuant to the Law on Public Investment, the State Budget Law, and the Construction Law.

- Spatial scope: Public Investment Capital for transport infrastructure construction from the central state budget managed by the Ministry of Construction.

- Temporal scope: secondary data covering two periods, 2016–2020 and 2021–2025; primary data collected from March 2024 to May 2025.

4. Research Methodology

The dissertation employs a mixed-methods research design combining qualitative and quantitative approaches. The qualitative phase includes a systematic literature review and in-depth semi-structured interviews with 09 experts (criterion: ≥ 5 years of direct experience; duration: 60–90 minutes per interview). The quantitative phase comprises a pilot survey (15 samples) and a main survey (136 valid samples). Data were analyzed using SmartPLS 3.0 software via PLS-SEM with 5,000 bootstrapping iterations.

5. Scientific and Practical Significance

- Scientific significance: Develops an integrated theoretical framework incorporating five management science principles into Public Investment Capital management for transport construction; constructs and validates a 27-indicator measurement system ($\alpha \geq 0.692$; $CR \geq 0.832$; $AVE \geq 0.513$); establishes the causal impact structure ($R^2 = 60.9\%$).

- Practical significance: Provides a quantitative KPI framework for evaluating Public Investment Capital management; establishes an empirical basis for prioritizing reforms; identifies specific bottlenecks (OR8: 2.99; CT4: 3.06; DR4: 3.16).

6. Dissertation Structure

In addition to the Introduction, List of Abbreviations, List of Tables and Figures, References, and Appendices, the dissertation comprises five chapters:

- Chapter 1 – Literature Review
- Chapter 2 – Theoretical Framework and Research Hypotheses
- Chapter 3 – Research Methodology
- Chapter 4 – Research Findings and Discussion
- Chapter 5 – Conclusions and Recommendations

CHAPTER 1: LITERATURE REVIEW

1.1. Review of Related Studies

The literature review is organized into four thematic groups: (1) public investment capital management; (2) efficiency of public investment capital management; (3) public investment management; and (4) public investment project management. Group (1) includes Trinh Van Vinh (2000), Nguyen Van Binh (2010), Tran Van Hong (2002), Nguyen Thi Lan Phuong (2018), De la Fuente (2004), Laursen & Myers (2009), and the PEFA Framework (2013). Group (2) includes Phan Thanh Mao (2003) and Dao Thi Ho Huong (2021). Group (3) includes Kyobe et al. (2011), Dabla-Norris et al. (2012), WB (2018), Do Van Thuan (2019), and Ngo Anh Tuan (2024). Group (4) includes Rajaram et al. (2010) and Ta Van Khoai (2009).

1.2. Research Gaps

The literature review identifies five research gaps:

- Gap 1: Absence of a comprehensive measurement model for Public Investment Capital management activities in transport construction grounded in management science principles.
- Gap 2: Lack of quantitative research establishing causal relationships between Public Investment Capital management activities and management outcomes in transport construction.
- Gap 3: Coordination among management stakeholders has not been studied as an independent and systematic management activity.
- Gap 4: Insufficient research focusing on the role of the line ministry (ministerial level) in managing central budget Public Investment Capital for transport infrastructure construction.
- Gap 5: No study has applied a combined quantitative methodology to both develop and validate a measurement model of Public Investment Capital management activities under Vietnamese conditions, nor has any study applied PLS-SEM in this domain.

1.3. Research Objectives, Questions, and Hypotheses

Four specific objectives: RO1 – systematize the theoretical foundations; RO2 – develop and validate a measurement indicator system; RO3 – establish the impact structure; RO4 – propose evidence-based management implications in order of priority. Ten research

hypotheses (H1–H5 on the measurement model; H6–H10 on the structural model) are presented in Chapter 2.

CHAPTER 2: THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

2.1. General Issues Concerning Public Investment Management for Transport Infrastructure Construction

Transport infrastructure is classified pursuant to Appendix I (Section IV) of Decree 06/2021/ND-CP. Public investment capital comprises funds from the state budget, national bonds, government bonds, and other lawful state sources as defined in the Law on Public Investment No. 58/2024/QH15. Public Investment Capital management for transport infrastructure construction is the process by which the competent authority carries out five management activities to achieve the established investment objectives, applying general management science principles in accordance with the Vietnamese legal context.

2.2. Public Investment Capital Management in Transport Infrastructure Construction

2.2.1. Concept and Context of Public Investment Capital Management for Transport Infrastructure Construction

2.2.2. Contents of Public Investment Capital Management for Transport Infrastructure Construction

2.2.2.1. Research hypotheses on indicators describing the content of capital planning for transport infrastructure construction

Research hypothesis H1 is formulated: the indicators describing the capital planning (PL) activity for Public Investment Capital in transport infrastructure construction comprise 8 indicators as presented in Table 2.1.

Table 2.1 Indicators describing the capital planning activity for public investment in transport infrastructure construction

No.	Code	Content
1	PL1	The extent to which guidelines on medium-term and annual public investment capital planning are disseminated fully and clearly to relevant departments and stakeholders.
2	PL2	The extent to which the medium-term and annual Public Investment Capital plan for transport infrastructure construction aligns with the development objectives and transport sector master plan.

3	PL3	The extent to which the Public Investment Capital plan for transport infrastructure construction is consistent with the capacity to balance public investment capital sources.
4	PL4	The extent to which the annual Public Investment Capital plan aligns with the approved medium-term public investment capital plan.
5	PL5	The rationality of the investment capital allocation plan in accordance with the principles, criteria, and allocation norms for public investment capital approved for each period.
6	PL6	The appropriateness of prioritization, project portfolio selection, and specific capital allocation for each project in the medium-term plan.
7	PL7	The extent to which investment policy decisions for projects are consistent with the capacity to balance public investment capital sources.
8	PL8	The clarity and specificity of descriptions of management solutions, organizational implementation arrangements, and anticipated outcomes in the Public Investment Capital plan for transport infrastructure construction.

2.2.2.2. Research hypotheses on indicators describing the content of organizing capital plan implementation for transport infrastructure construction

Research hypothesis H2 is formulated on the basis of the indicators describing the organizing of capital plan implementation activities, comprising 8 specific indicators as presented in Table 2.2.

Table 2.2 Indicators describing the content of organizing capital plan implementation for public investment in transport infrastructure construction

No.	Code	Content
1	OR1	The appropriateness of the detailed allocation of planned public investment capital to each project in accordance with prescribed criteria.

2	OR2	The timeliness of assigning capital plan targets and detailed capital allocations to investors in full compliance with prescribed criteria.
3	OR3	The extent to which project implementation proceeds on schedule and in accordance with the capital plan approved by the competent authority.
4	OR4	The timeliness of contractor selection for bid packages of projects allocated capital under the approved public investment plan.
5	OR5	The extent to which the acceptance, payment, and settlement of completed volumes/bid packages delivered for use are conducted in accordance with contractual schedules.
6	OR6	The extent to which the investment scope and scale of each project are implemented in accordance with the allocated capital plan.
7	OR7	The appropriateness of ensuring implementation accountability of all relevant parties in the execution of the capital plan.
8	OR8	The appropriateness of balancing capital sources to settle construction debts in arrears as stipulated by the Law on Public Investment.

2.2.2.3. Research hypotheses on indicators describing the content of directing capital plan implementation for transport infrastructure construction

Research hypothesis H3 is formulated: the indicators describing the directing of capital plan implementation activity comprise 5 main indicators as presented in Table 2.3.

Table 2.3 Indicators describing the content of directing capital plan implementation for public investment in transport infrastructure construction

No.	Code	Content
1	DR1	The quality of organizational solutions for directing the implementation of the public investment capital plan under the authority of the managing body.

2	DR2	The quality of instructions and direction of work within the scope of management responsibility during the implementation of the public investment capital plan.
3	DR3	The extent to which individual accountability and institutional accountability are upheld within the scope of responsibility during capital plan implementation.
4	DR4	The appropriateness of motivational mechanisms created to encourage individuals and units to fulfil their objectives and responsibilities during capital plan implementation.
5	DR5	The appropriateness of the exercise of decision-making autonomy during the deployment of the public investment capital plan.

2.2.2.4. Research hypotheses on indicators describing the content of controlling capital plan implementation for transport infrastructure construction

Research hypothesis H4 is formulated on the basis of indicators describing the control of capital plan implementation, comprising 5 indicators as presented in Table 2.4.

Table 2.4 Indicators describing the content of controlling capital plan implementation for public investment in transport infrastructure construction

No.	Code	Content
1	CT1	The appropriateness of monitoring and inspecting activities related to the formulation, appraisal, approval, and implementation of the public investment capital plan.
2	CT2	The appropriateness of monitoring and inspecting the entire project investment process in accordance with approved investment capital contents and indicators.
3	CT3	The appropriateness of monitoring and inspecting the incidence of waste and losses in public investment.
4	CT4	The appropriateness of supervising and evaluating public investment projects to identify deficiencies and

		limitations and their root causes in capital plan implementation.
5	CT5	The appropriateness of remedial actions and solutions addressing deviations between actual implementation and the approved public investment capital plan.

2.2.2.5. Research hypotheses on indicators describing the content of coordination among stakeholders in Public Investment Capital management for transport infrastructure construction

Research hypothesis H5 is formulated on the basis of indicators describing coordination activities in capital plan implementation, comprising 5 indicators as presented in Table 2.5.

Table 2.5 Indicators describing the content of coordination in capital plan implementation for public investment in transport infrastructure construction

No.	Code	Content
1	CO1	The level of coordination between investors and the lead agency in developing and implementing the public investment capital plan.
2	CO2	The level of coordination between the investment planning authority and the lead agency in developing and implementing the public investment capital plan.
3	CO3	The level of coordination between the finance authority and the lead agency in developing and implementing the public investment capital plan.
4	CO4	The level of coordination between the State Treasury and investors in the advance, payment, and settlement of public investment capital.
5	CO5	The level of coordination between contractors and investors in the payment and settlement of public investment capital.

2.3. Dynamic Model of Public Investment Capital Management Activities for Transport Infrastructure Construction

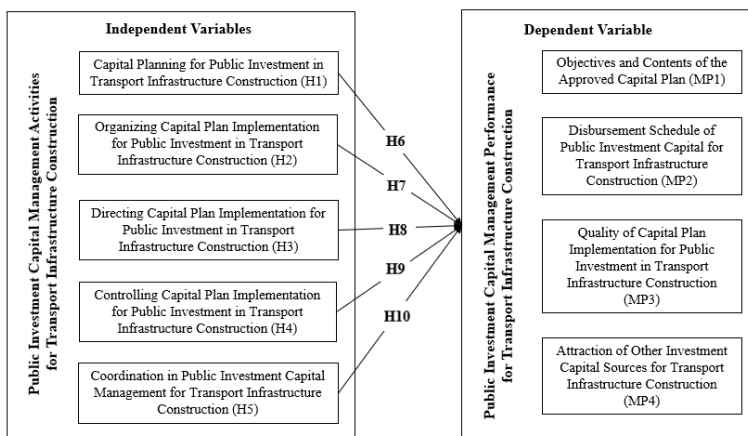
On the basis of the Law on Public Investment, the performance indicators of Public Investment Capital management for transport infrastructure construction in Vietnam are specified as follows:

Table 2.6 Indicators describing the performance of public investment capital management for transport infrastructure construction

No.	Symbol	Content
1	MP1	The degree to which objectives and contents are achieved in actual implementation compared to the approved capital plan for public investment activities.
2	MP2	The extent to which the public investment capital disbursement schedule is maintained relative to the approved plan.
3	MP3	The quality of Public Investment Capital plan implementation (economy, efficiency, and resource balancing capacity; prevention of losses and waste).
4	MP4	The degree to which capital from other sources is attracted to participate in transport infrastructure investment activities.

In examining management activities in relation to management outcomes, the dynamic model of management content is formulated under the hypothesis that the management activities of the managing entity positively and significantly influence the performance of Public Investment Capital management for transport infrastructure construction (H6, H7, H8, H9, H10) (Figure 2.4).

Figure 2.4 Research hypothesis model



CHAPTER 3: RESEARCH METHODOLOGY

3.1. Research Design

The dissertation adopts a positivist paradigm following the mixed-methods research design of Creswell (2014) in sequential order: qualitative research → pilot study → quantitative verification. PLS-SEM was selected for its suitability for theory exploration, its flexibility with non-normally distributed data, and its robust performance with small samples.

Figure 3.1 Research design model

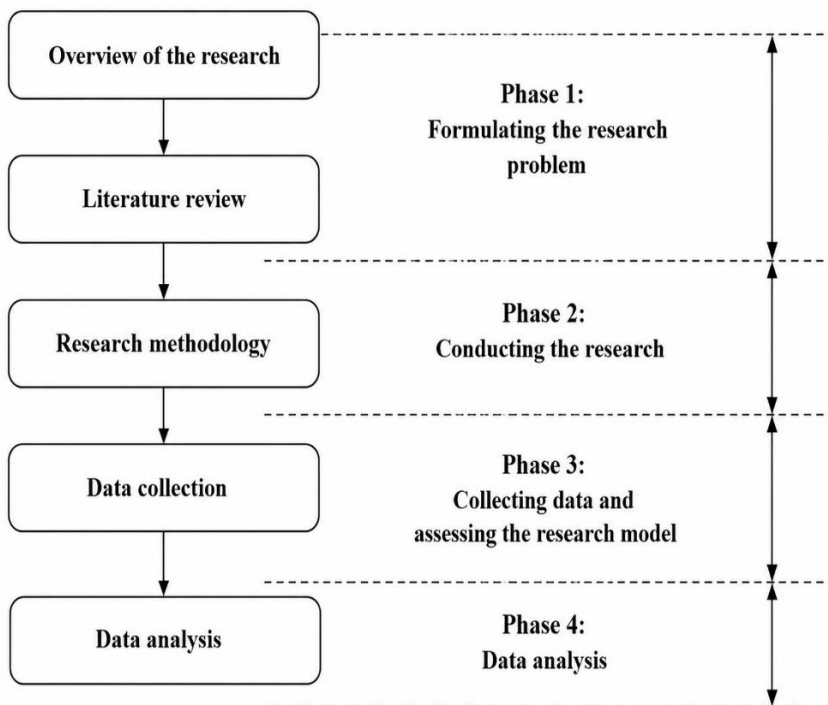


Table 3.1 Implementation of research tasks

No.	Research Task	Research Tool	Method	Expected Outcome
1	Literature review on Public Investment Capital management for	Review documents	Qualitative research	Synthesized understanding; research objectives,

	transport construction; identify research direction.			questions and scope identified.
2	Develop a model of indicators describing Public Investment Capital management activities for transport construction.	Review documents ; expert interviews	Qualitative research	Model of indicators describing Public Investment Capital management activities for transport construction.
3	Quantitative analysis of indicators describing Public Investment Capital management activities for transport construction.	Empirical survey and statistical analysis	Quantitative research	Quantitative model of indicators describing Public Investment Capital management activities for transport construction.
4	Discuss research findings; assess the current state of Public Investment Capital management for transport construction in Vietnam.	Statistical analysis; deduction	Mixed quantitative and qualitative	Recommendations for enhancing Public Investment Capital management effectiveness for transport construction.

3.2. Implementation of the Research Process

3.2.1. Qualitative Research

A systematic literature review was conducted alongside in-depth interviews with 09 experts (criterion: ≥ 5 years of direct experience in Public Investment Capital management for transport construction;

duration: 60–90 minutes per interview). The sample of 09 experts satisfies the data saturation principle. The outcome was an initial set of 31 indicators and a survey instrument structured as follows: Part A – respondent information; Part B – 31 management indicators on a 5-point Likert scale; Part C – 4 management performance indicators (MP).

3.2.2. Pilot Study

Conducted with 15 randomly selected respondents (09 directly involved, 03 indirectly involved, 03 researchers) to assess the clarity and consistency of the questionnaire.

3.2.3. Main Quantitative Survey

Target respondents: staff at the Ministry of Construction, Ministry of Finance, investors, project management boards, and audit agencies. Data collection period: March 2024 to May 2025. Total valid questionnaires: 136.

CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION

4.1. Descriptive Analysis of the Research Sample

The survey yielded 136 valid responses comprising: Project Management Boards 74 (54.4%), Ministry of Construction 29 (21.3%), Planning and Investment Authority 13 (9.6%), Finance Authority 7 (5.1%), State Audit 13 (9.6%). Work experience: over 10 years 65.4%, 5–10 years 21.3%, under 5 years 13.2%. Direct involvement 64%, indirect 36%.

4.2. Analysis of Public Investment Capital Management Activities for Transport Infrastructure Construction

4.2.1. Public Investment Capital Management Performance (2016–2025)

Table 4.4 Descriptive analysis of overall management performance (MP) in public investment capital implementation

Indicator	N	Min	Max	Mean	Std. Dev.
MP1	136	2.00	5.00	3.6324	.67559
MP2	136	1.00	5.00	3.0074	.94670
MP3	136	1.00	5.00	3.0662	.88780
MP4	136	1.00	5.00	2.6912	.82115

4.2.2. Current State of Capital Planning Indicators (PL)

Table 4.5 Descriptive statistics for capital planning indicators

Indicator	N	Min	Max	Mean	Std. Dev.
PL1	136	1.00	5.00	3.3309	.71030
PL2	136	1.00	5.00	3.5221	.74004
PL3	136	1.00	5.00	3.2206	.57980
PL4	136	2.00	5.00	3.5662	.65209
PL5	136	2.00	5.00	3.2059	.84431
PL6	136	1.00	5.00	3.1691	.87395
PL7	136	1.00	5.00	3.5221	.75979
PL8	136	1.00	5.00	3.2794	.67430
Valid N	136				

4.2.3. Current State of Capital Plan Implementation Organization Indicators (OR)

Table 4.7 Descriptive statistics for capital plan implementation organization indicators

Indicator	N	Min	Max	Mean	Std. Dev.
OR1	136	1.00	4.00	3.0662	.82733
OR2	136	2.00	5.00	3.1324	.91739
OR3	136	1.00	5.00	3.1765	.90988
OR4	136	1.00	5.00	3.1985	.87619
OR5	136	1.00	5.00	3.5368	.71914
OR6	136	1.00	5.00	3.4926	.66663
OR7	136	1.00	5.00	3.3824	.67833
OR8	136	1.00	5.00	2.9926	.84762
Valid N	136				

4.2.4. Current State of Capital Plan Direction Indicators (DR)

Table 4.8 Indicators assessing capital plan direction activities

Indicator	N	Min	Max	Mean	Std. Dev.
DR1	136	1.00	5.00	3.6691	.66728
DR2	136	1.00	5.00	3.6618	.62326
DR3	136	2.00	5.00	3.3382	.66911
DR4	136	1.00	5.00	3.1618	.75248
DR5	136	2.00	5.00	3.2574	.67765
Valid N	136				

4.2.5. Current State of Capital Plan Control Indicators (CT)

Table 4.9 Indicators assessing capital plan control activities

Indicator	N	Min	Max	Mean	Std. Dev.
CT1	136	2.00	5.00	3.4044	.64840
CT2	136	2.00	5.00	3.1765	.87671
CT3	136	2.00	5.00	3.0735	.84004

CT4	136	2.00	5.00	3.0588	.80521
CT5	136	2.00	4.00	3.3456	.53581
Valid N	136				

4.2.6. Current State of Coordination Indicators (CO)

Table 4.10 Descriptive statistics for coordination indicators in Public Investment Capital management

Indicator	N	Min	Max	Mean	Std. Dev.
CO1	136	2.00	5.00	3.3529	.79377
CO2	136	2.00	5.00	3.4412	.67511
CO3	136	1.00	5.00	3.4485	.65342
CO4	136	1.00	5.00	3.2794	.83170
CO5	136	2.00	5.00	3.4118	.78382
Valid N	136				

4.3. Regression Analysis of the Impact Model of Public Investment Capital Management Activities

Figure 4.3 Initial Cronbach's Alpha reliability analysis model

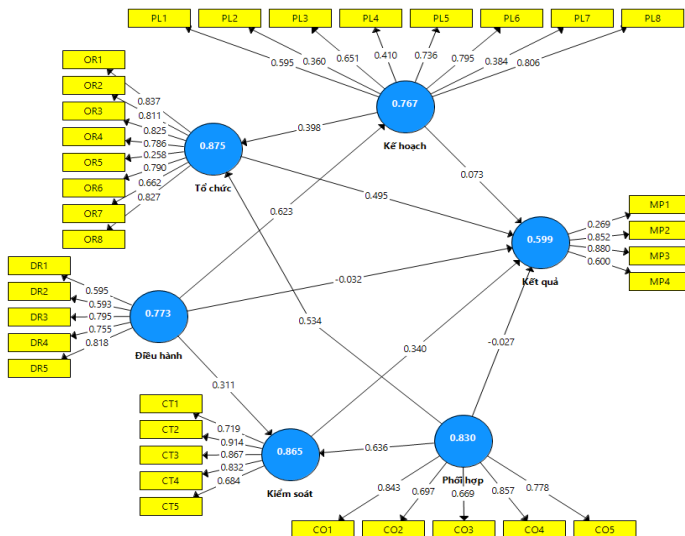
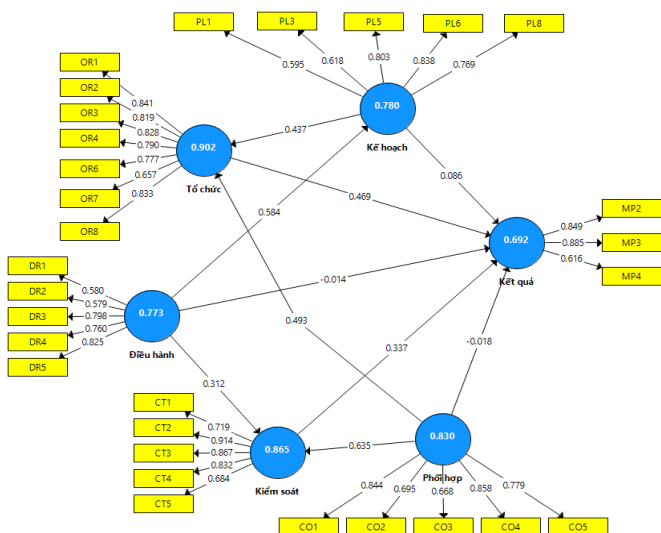


Figure 4.4 Cronbach's Alpha reliability analysis model after removal of weak-loading observed variables



Hypothesis	Coef. (β)	VIF	R ²	Adj. R ²	P-Value	Result
PL \rightarrow MP	0.086	2.376	0.624	0.609	0.352	Not supported
OR \rightarrow MP	0.469	3.382			0.000	Supported
DR \rightarrow MP	-0.014	1.797			0.857	Not supported
CT \rightarrow MP	0.337	3.210			0.007	Supported
CO \rightarrow MP	-0.018	3.142			0.864	Not supported
PL \rightarrow OR	0.437	1.518			0.000	Supported
DR \rightarrow PL	0.584	1.000			0.000	Supported
DR \rightarrow CT	0.312	1.238			0.000	Supported
CO \rightarrow OR	0.493	1.518			0.000	Supported
CO \rightarrow CT	0.635	1.238			0.000	Supported

Table 4.12 Model analysis results

The PLS-SEM structural model was estimated using 5,000 bootstrapping iterations. Test results confirm that hypotheses H7 and H9

are supported — OR and CT exert statistically significant direct effects on Public Investment Capital management performance (MP):

- OR → MP: $\beta = 0.469$ ($p < 0.001$)

- CT → MP: $\beta = 0.337$ ($p < 0.05$)

Hypotheses H6, H8 and H10 are not supported — PL, DR and CO do not exert statistically significant direct effects on MP ($\beta = 0.086$; -0.014; -0.018 respectively; $p > 0.05$). However, these three activity groups exhibit statistically significant indirect effects: PL acts indirectly via OR ($\beta = 0.437$); DR acts indirectly via CT ($\beta = 0.312$) and PL ($\beta = 0.584$); CO acts indirectly via OR ($\beta = 0.493$) and CT ($\beta = 0.635$).

VIF values for all variables are below 3.382 (below the threshold of 10 per Hair et al.), indicating an absence of multicollinearity. The model accounts for 60.9% of the statistically significant variance in Public Investment Capital management performance for transport infrastructure construction in Vietnam.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1. New Findings and Contributions from the Research

5.1.1. Theoretical Contributions

The dissertation develops and empirically validates a comprehensive measurement model comprising 27 indicators describing the 5 core activities of Public Investment Capital management for transport infrastructure construction: capital planning (PL), organizing implementation (OR), directing implementation (DR), controlling implementation (CT), and coordination (CO). The principal innovation relative to prior research is the incorporation of coordination (CO) as an independent management function, reflecting the multi-stakeholder nature of Public Investment Capital management in Vietnam. All 27 indicators satisfy international statistical thresholds: Cronbach's Alpha 0.692–0.902; CR 0.832–0.922; $AVE \geq 0.513$. The empirical regression model achieves Adj. $R^2 = 0.609$, explaining 60.9% of the variance in Public Investment Capital management performance — a substantial explanatory level for research in the public management domain.

5.1.2. Practical Contributions

This study represents the first systematic quantification and hierarchical classification of the influence of management factors on Public Investment Capital management performance for transport construction in Vietnam. OR exhibits the strongest direct effect ($\beta = 0.469$; $p < 0.001$), followed by CT ($\beta = 0.337$; $p < 0.01$) — both constitute the direct pillars determining output results. PL, DR, and CO, while lacking direct statistically significant effects, play important indirect roles: PL via OR ($\beta = 0.437$); DR via PL ($\beta = 0.584$) and CT ($\beta = 0.312$); CO via OR ($\beta = 0.493$) and CT ($\beta = 0.635$). This impact structure confirms that the quality of implementation organization and execution monitoring are the critical determinants, while planning, directing, and coordination serve as necessary conditions that create the foundation for OR and CT to function effectively.

5.2. Conclusions from Research Findings

5.2.1. Enhancing the Quality of Capital Plan Implementation Organization

OR is the factor with the strongest direct effect on Public Investment Capital management performance ($\beta = 0.469$). Mean scores for OR indicators range from 2.99 to 3.54, with OR8 (settlement of

construction arrears) recording the lowest value (2.99). Key recommendations include: professionalizing project management boards by clearly separating investor functions from management and execution functions; standardizing processes with direct individual accountability for schedule, cost, and quality of each contract package; advancing digitalization through PMIS and BIM; and establishing an integrated arrears settlement mechanism within the public investment financial management system.

5.2.2. Strengthening the Effectiveness of Capital Plan Control

CT is the factor with the second strongest direct effect ($\beta = 0.337$). Mean scores for CT indicators range from 3.06 to 3.40, with CT4 (identification of deficiencies and proposal of solutions) recording the lowest value (3.06). Key recommendations include: transitioning from ex-post audit-based control to real-time process monitoring using digital technology; establishing independent oversight mechanisms; and building a systematic post-project evaluation database as a foundation for policy improvement.

5.2.3. Improving the Methodology and Content of Capital Planning

PL exerts an indirect effect on outcomes via OR ($\beta = 0.437$). PL3 and PL6 record the lowest scores within the group (3.22 and 3.17), reflecting a planning approach that remains excessively aspirational. Key recommendations include: reforming planning methodology by grounding plans in a realistic assessment of each investor's capital absorption capacity; and developing quantitative project selection criteria to address the persistent problem of fragmented investment.

5.2.4. Reforming the Capital Plan Direction Approach

DR exerts indirect effects via PL ($\beta = 0.584$) and CT ($\beta = 0.312$). DR4 (incentive creation) records the lowest score within the group (3.16). Key recommendations include: establishing flexible direction mechanisms that permit capital reallocation among projects within the same group without requiring approval from multiple administrative levels; and establishing clear reward-and-penalty mechanisms linked to disbursement outcomes and construction progress.

5.2.5. Improving Coordination Mechanisms among Public Investment Capital Management Stakeholders

CO exerts the strongest indirect effect via CT ($\beta = 0.635$ — the highest among all indirect relationships) and via OR ($\beta = 0.493$). CO4 (coordination between the State Treasury and investors) records the

lowest score within the group (3.28). Key recommendations include: institutionalizing legally binding inter-agency coordination regulations; and developing a shared database enabling all agencies to access real-time information on disbursement status and project progress.

5.2.6. Improving the Institutional and Policy Framework for Public Investment Capital Management

Recommendations include: resolving legislative overlaps between the Law on Public Investment, the Construction Law, the State Budget Law, and the Bidding Law; transitioning from qualitative evaluation criteria to a quantitative KPI system linked to clear reward-and-penalty mechanisms; and integrating ESG criteria and Life Cycle Costing methodology into the planning and project evaluation process.

5.3. Limitations of the Dissertation

The first limitation concerns sample size. The 136 valid primary data observations, while meeting the minimum threshold for PLS-SEM with 5,000-iteration bootstrapping, are not sufficiently large to guarantee the highest level of representativeness for the entire Public Investment Capital management community for transport construction in Vietnam. Subsequent studies should expand the sample size to enhance reliability and generalizability.

The second limitation pertains to the scope of secondary data. Managerial behavior in Public Investment Capital management is rarely fully captured in official statistical systems, leading to interpretations of quantitative findings based primarily on consolidated reports from the Ministry of Construction and the Ministry of Finance, which are somewhat limited in scope.

The third limitation is the spatial scope of the study. The dissertation focuses on Public Investment Capital for transport construction managed by the Ministry of Construction from the central state budget, excluding capital managed at the provincial level. Extending the research to the subnational level in future studies would enable comparisons across management models, enriching the theoretical and practical foundations of this field.

5.4. Recommendations for Future Research Directions

5.4.1. Research to Update and Supplement Measurement Indicators

Public Investment Capital management for transport construction is a highly dynamic field subject to continuous changes in policy,

technology, and the legal context. The 27-indicator system developed in this dissertation requires periodic review and supplementation through subsequent empirical studies, particularly given that digital transformation and sustainable development are becoming mandatory requirements in public investment management. Theoretically, integrating additional factors such as transformational leadership, institutional capacity, human capital quality, and digitalization could enhance the model's explanatory power beyond the current 60.9% threshold, while broadening the theoretical framework to incorporate organizational theory, institutional theory, and political economy perspectives.

5.4.2. Comparative Research by Management Stakeholder

The current findings reflect an aggregated perspective across multiple stakeholder groups without in-depth analysis of inter-group differences. Future studies should conduct systematic comparative analyses among the lead agency, project management boards, finance authorities, the State Treasury, and audit agencies to clarify differences in management perceptions and behaviors, thereby informing the design of more appropriate coordination and control mechanisms. Extending the research to the subnational level and comparing central and local Public Investment Capital management will provide a more comprehensive picture of Vietnam's public investment management system, supporting policy formulation and institutional reform in the country's next phase of development.

LIST OF PUBLISHED SCIENTIFIC WORKS

The following scientific works related to the dissertation topic have been published by the doctoral candidate:

1. Tran Tuan Phong & Nguyen Luong Hai (2024). "Research on indicators for evaluating capital planning activities of public investment in transport infrastructure construction in Vietnam". *Journal of Transport*, March 2024, pp. 145–148.
2. Tran Tuan Phong & Nguyen Luong Hai (2024). "Research on indicators for evaluating the organizing of capital plan implementation in public investment for transport infrastructure construction in Vietnam". *Journal of Transport*, October 2024, pp. 139–142.
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