

## The effects of different factors influencing the results of public investment in educational institutions in Vietnam

Van Hung Pham<sup>a</sup>, Thi Yen Le<sup>b\*</sup> and Minh Hoa Pham<sup>c</sup>

<sup>a</sup>National Economics University, Vietnam

<sup>b</sup>Ha Noi Architectural University, Vietnam

<sup>c</sup>Ministry of Finance, Vietnam

### CHRONICLE

#### Article history:

Received: March 16, 2020

Received in revised format:

May 30 2020

Accepted: June 21, 2020

Available online:

June 25, 2020

#### Keywords:

Public Investment

Results of public investment

Educational institutions

Vietnam

### ABSTRACT

This study aims to examine the factors affecting public investment results in educational institutions in Vietnam. The study uses exploratory factor analysis (EFA) as well as regression estimate to determine the factors. The results show that factors affecting public investment results include public investment management, human resources to carry out public investment activities and to organize public investment, economic conditions, legal policies and natural conditions. These factors have different levels of influence on the results of public investment in educational institutions in Vietnam. From the results of that study, the authors propose recommendations to enhance the results of public investment activities at educational institutions in Vietnam.

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## 1. Introduction

Public investment is one of the important and decisive factors for economic growth in countries in general and in Vietnam in particular. Public investment is focused primarily on the construction of economic and technical infrastructure, education, health, poverty reduction. Funding sources for public investment are mainly from the state budget and foreign aid. However, in recent years, as the rate of increase in investment in general and public investment, in particular, has expanded, the effectiveness has decreased; Waste and corruption are more and more common, that figure increases to 20% - 30%. The acceptance of investment policies as well as investment decisions are still based mainly on socio-economic development requirements and ability to raise capital. Meanwhile, the results and efficiency standards of public investment items have not been considered as a decisive factor for public investment decisions and do not have strict legal binding. Mechanisms, policies and investment management tools exist many limitations, inadequacies and slowly being overcome. According to data from the World Bank (WB), the scale of state budget expenditure on education relative to GDP of most countries increased on average from 4.1% of gross domestic product (GDP) in 1999 to 4.8% of GDP in 2015. Another statistics shows that the scale of state budget expenditure on education increased from about 0.69% of GDP in 2011 to about 2.16% of GDP in 2017 in Myanmar; from 2.81% of GDP in 2010 to 3.58% of GDP in 2015 in Indonesia; from 4.8% of GDP in 2011 to 5.2% of GDP in 2015 in Korea; from 5.29% of GDP in 2011 to 5.57% of GDP in 2016 in Argentina; from 4.5% of GDP in 2013 to 5.35% of GDP in 2016 in Chile. In Vietnam, in the fields that are prioritized for public investment, education is always prioritized by the government to realize the highest goal of long-term sustainable development. The scale of state budget spending on education has always been on an upward trend, particularly in 2013, the scale of budget expenditure for this field was VND 155,604 billion, this figure increased to VND 248,118 billion in 2017. In the school year of 2017-2018, the total number of

\* Corresponding author.

E-mail address: [lethiyenkttdt@gmail.com](mailto:lethiyenkttdt@gmail.com) (T.Y. Le)

educational institutions at all levels is 43,907 schools, which 40,952 are public and 2,955 are non-public training institutions. This shows that the position and important role of public investment in educational institutions in Vietnam is very large, especially for public training institutions. Besides these achievements, public investment in education in Vietnam also reveals limited issues such as inappropriate investment structure in education; the investment structure for education levels is not commensurate (investment for vocational training, college and university levels accounts for about 20% of total spending on education). Although basic construction investments at educational institutions are still difficult, the rate of investment losses, investment results for these items are not high. Therefore, it is necessary to study the factors influencing the results of public investment in educational institutions in Vietnam. The results of the study are the basis for proposing recommendations to contribute to the improvement of public investment results in this field.

## 2. Research overview

Public investment receiving the attention of not only planners but also researchers, the research directions are approached in different aspects with the different methods applied. Regarding the management of investment projects, research by Love and Irani (2003) has shown that: A quality cost management system project template should be developed to determine quality in a construction project. Besides, when carrying out capital construction investment projects, the project activities should be divided into work segments, is completed by different branches and is operated independently. The division of project types and modes of operation also has a great influence on the project cost management process (Love et al., 1999; Kuntadia et al., 2020). In the view of Love (2002), the author considers the role of the parties in activities of managing capital construction investment capital - specifically with a construction project determined to give his commentary on issues of management expenses of investment activities. The approach in terms of review of State management experience on infrastructure investment in some different countries through the use of the State budget, Laursen and Myers (2009) summarized the experience of State management on infrastructure construction investment in EU member countries, data for research was collected by the author from 2000 to the end of 2006, the focus is mainly on examining management experience in this investment item in the UK and some developed countries. During the author's research period, countries of the EU are those with public debts, which belong to the group of countries with large public debts of the world, this can also be a lesson for the management of capital construction investment activities using the State budget in Vietnam, thus, it is possible to avoid a part of the sharp increase in public debt and uncontrollable control. Meanwhile, some researchers when considering investment from the state sector, this source of investment is considered this investment as an input to the production process (Arrow & Lind, 1970). Research has shown that public investment plays a role and contributes positively to economic growth. Afterwards, the researchers inherited the study of Arrow and Lind (1970) to continue developing research on public investment and one of them is the endogenous growth model of Glomm and Ravikumar (1994), Fisher and Turnovsky (1998). Studying growth models in an area, assuming that production only takes place in an area that is the private sector, the aggregate production function now includes public investment, private investment and labor. However, in this model, public investment plays an additional role, supporting the private sector to create economic growth, besides public investment resources are generated by taxes and debt, this tax is partly contributed by the private sector when operating effectively. Glomm and Ravikumar (1992) also proved the existence of a unique competitive equilibrium represented by the Euler equation and established the existence of an optimal public investment plan. Pereira and Andraz (2012, 2013) conducted a study to review the studies related to the economic impact of infrastructure investment using investment capital from the State budget.

To evaluate the results and effectiveness of public investment, Dabla-Norris et al. (2012) proposed some new indicators to assess the effectiveness of public investment management through four steps of process project evaluation, project selection, project implementation and project assessment based on surveys in 71 countries with 40 low-income countries, and 31 middle-income countries, the research returns show that these indicators can be applied to assess public investment policy and compare among countries with similar conditions and very appropriate for countries concerned with reform and improving the efficiency of public investment. One of the aspects that are also interested and exploited by the researchers is considering the factors that affect the results and efficiency of public investment, Haque and Kneller (2008) have proved that institutional factors have a great influence on the efficiency of public investment, the authors also said: Unlike non-business expenditure source, the use of capital construction investment capital and the choice of development investment projects are affected by the erratic, corrupt attitude of politicians and state officials. The decision of an investment project sometimes depends on the number of money investors give to officials, rather than who will be able to offer good prices and quality of service, a variety of programs, public projects are selected because they can create illegal income for more people than improving the quality of life for everyone. Therefore, the influence of the institutional system on total investment capital is often distorted leading to low efficiency, waste, or corruption (Dabla-Norris et al., 2012). For many countries, public investment is also seen as a tool to seek the interests of various interest groups, including parliamentary politicians, aggregators, line ministries and localities. These are also challenges for all countries, especially developing countries like Vietnam, in the process of reforming the public investment management system (World Bank, 2010). The above studies have focused on different aspects of public investment, but not many studies have focused on factors affecting public investment in educational institutions, specifically considering the factors affecting public investment results from the perspective of entities directly involved in public investment activities. This study was carried for that purpose, with data collected from a survey of actors involved in the implementation of public investment projects in educational facilities using state capital in Vietnam, those data were analyzed using exploratory factor analysis (EFA) and multivariate regression (OLS) to analyze the influence of each factor on the results of public investment in educational institutions in Vietnam.

### 3. Research method

#### 3.1. Data collection method

The study uses data collected from officials directly carrying out activities related to public investment in educational establishments using state capital in Vietnam, selected individuals surveyed to be knowledgeable about public investment activities in educational institutions in Vietnam. Specifically, the research team conveyed a direct personal survey of public investment activities at educational institutions in Vietnam (Including state management officials, officials of investors, personal under the unit implementing public investment projects). Regarding the determination of sample sizes in a study: For factor analysis: Based on the study of Hair et al. (1998) for reference on the expected sample size. Accordingly, the minimum sample size is 5 times the total number of observed variables; For multivariate regression analysis: The minimum sample size to achieve is calculated using the formula:  $50 + 8 \times m$  (m: number of independent variables) (Tabachnick & Fidell, 1996; Sarhan & Shishany, 2020). Thus, the minimum number of observations for the study is 125 observations. To ensure the minimum number of observations, the research team issued 600 surveys, handle surveys via two forms: Send an email waiting for a response and send a survey form directly. After the survey, the author collected 362 questionnaires, but 73 questionnaires did not meet the requirements for full survey information, the author removed surveys that did not meet this requirement, perform 289 questionnaires which meet the requirements of excel software and perform analysis. The survey is designed based on the research overview and the survey is divided into 2 parts:

Part 1: General information of personally selected to survey.

Part 2: The assessment of the objects surveyed about factors influencing the results of public investment in education institutions in Vietnam.

#### 3.2. Data analysis method

The collected data will be processed, cleaned, entered and encoded data into the excel file. The author then used the models and quantitative calculations to process the data. The study was carried out with the help of SPSS 20.0 software Exploration factor analysis method (EFA) and the multivariate regression method will be used by the author for analysis in this study. The proposed research model is as follows:

**Table 1**  
The proposed research model

The dependent variable	Measure (Items)	Sign	Bases for selecting variables
Results of public investment in education	- Financial results	DTC1	Phuong and Pham (2013), Thuy and Dat (2018)
	- The results achieved in terms of social	DTC2	
	- The results achieved in terms of execution time	DTC3	
The independent variables	Measure (Items)	Sign	Bases for selecting variables
1. About natural conditions (DKTN)	+ Geographic location	DKTN1	Chidlow and Young (2008), Phuong and Pham (2013), Thuy and Dat (2018)
	+ Terrain conditions	DKTN2	
	+ Climate conditions	DKTN3	
2. About economic conditions (DKKT)	+ Planning public investment for education	DKKT1	Dabla-Norris et al. (2011), Esfahani and Ramirez (2003), Haque and Kneller (2008), Flyvbjerg et al. (2003), Phuong and Pham (2013), Thuy and Nguyen (2018)
	+ Reasonable resource allocation	DKKT2	
	+ Public investment plans are prepared accurately	DKKT3	
3. Policies and laws (CSPL)	+ Strict and complete legal system	CSPL1	Pham Minh Hoa (2017), Dabla-Norris et al. (2011) Haque and Kneller (2008), Thuy and Dat (2018)
	+ Public and transparent system of policies and laws	CSPL2	
	+ Accuracy in public investment policy	CSPL3	
	+ Publicity and transparency in public investment	CSPL4	
4. The management of public investment (QLDT)	+ The process of making, appraising and approving public investment projects to ensure strict compliance with the law	QLDT1	Phuong and Pham (2013), Pham (2017)
	+ The contractor selection process. Investors meet the requirements of each project and work item	QLDT2	
	+ Decentralized management of public investment	QLDT3	
	+ Reasonable arrange of public investment capital	QLDT4	
5. Organizing the implementation of public investment (TCTH)	+ Implementation planning and organizational structure management	TCTH1	Pham Minh Hoa (2017), Thuy and Dat (2018), Phuong and Pham (2012)
	+ Mobilizing and using capital for the project to ensure progress	TCTH2	
	+ Implementation the content follow schedule request of project implementation	TCTH3	
6. Human Resources (NLQL)	+ Management capacity of the investor	NLQL1	Phuong and Hung (2013), Pham (2017), Thuy and Dat (2018), Thuy (2018)
	+ The inspection and supervision capacity of project management officials	NLQL2	
	+ Scientific and technical level of the project implementation unit	NLQL3	
	+ Project implementation experience of implementing units	NLQL4	
	+ Financial capacity of implementing units	NLQL5	

Source: Compiled by author

#### 4. Research findings

People participating in public investment projects in educational institutions are those directly involved in various steps of investment projects, the fake reviews of individuals are the basis for evaluation from the perspective of micro-approach when evaluating the results and effectiveness of public investment projects in educational institutions. With the collected survey data, the research will examine a factor analysis and multivariate regression to analyze the impact of factors on public investment outcomes in educational institutions in Vietnam. To perform factor analysis, the team first tested the reliability of the scales using the Cronbach's alpha coefficient, the results show that Cronbach's common alpha coefficient of common items is satisfactory, after that, the research team performed data testing for the study to be suitable for performing factor analysis or not using KMO and Bartlett's tests, the results showed that:

**Table 2**

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.754
Bartlett's Test of Sphericity	Approx. Chi-Square	2804.972
	Df	231
	Sig.	.000

*Source: Analytical results of the author*

Test results of KMO and Bartlett's Test in the above table show that this database is perfectly suitable because the test value reached 0.754 (in the range of 0.5 to 1) is statistically significant at the 1% level (Sig. = 0.000 < 0.005). So, the author's research model is appropriate. For factor analysis, the study used specific values (Eigenvalue) to determine the number of factors:

**Table 3**

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.767	17.124	17.124	3.767	17.124	17.124	3.538	16.083	16.083
2	3.267	14.850	31.974	3.267	14.850	31.974	2.771	12.596	28.679
3	2.991	13.594	45.567	2.991	13.594	45.567	2.561	11.640	40.319
4	2.228	10.128	55.695	2.228	10.128	55.695	2.278	10.354	50.673
5	1.873	8.513	64.208	1.873	8.513	64.208	2.132	9.691	60.365
6	1.255	5.703	69.912	1.255	5.703	69.912	2.100	9.547	69.912
7	.660	3.001	72.913						
8	.622	2.827	75.740						
9	.581	2.642	78.382						
10	.575	2.612	80.994						
11	.533	2.422	83.416						
12	.514	2.337	85.753						
13	.444	2.019	87.772						
14	.425	1.932	89.703						
15	.382	1.735	91.439						
16	.358	1.628	93.066						
17	.339	1.540	94.606						
18	.302	1.372	95.978						
19	.263	1.195	97.174						
20	.228	1.035	98.209						
21	.206	.935	99.144						
22	.188	.856	100.000						

*Source: Analytical results of the author*

The analysis results show that corresponding to 22 observed variables, 22 calculated characteristic values, after the final EFA analysis, 6 factors with characteristic values equal to or greater than 1 were retained, the remaining elements with eigenvalue values less than 1 will not be used, which means that 22 observed variables will converge to 6 factors. Also from the results, the total "Rotation sums of squared loadings" reached a high level (69.912%), this implies the use of 6 factors representing 22 items explained about 70% of the observed variables. For research in the field of social sciences, the sum of the squared factor load factors of about 50% is acceptable, thus, it can be concluded: Use 6 factors to reflect the information of the 22 observations. Thus, based on the Rotated Component Matrix from EFA analysis, we have 6 factors created from 22 items: Factor 1 includes 5 items named NLQL: Human Resources; Factor 2 includes 4 items named QLDT: Public investment management; Factor 3 consists of 4 items named CSPL: Policies and laws; Factor 4 consists of 3 items named TCTH: Organization of public investment; Factor 5 consists of 3 items named DKTN: Natural condition; and factor 6 includes 3 items named DKKT: Economic conditions.

**Table 4**  
Rotated Component Matrix

	Component					
	1	2	3	4	5	6
NLQL1	.894					
NLQL2	.861					
NLQL3	.827					
NLQL4	.806					
NLQL5	.797					
QLDT1		.855				
QLDT2		.826				
QLDT3		.821				
QLDT4		.785				
CSPL3			.813			
CSPL1			.801			
CSPL4			.779			
CSPL2			.771			
TCTH2				.887		
TCTH1				.875		
TCTH3				.798		
DKTN1					.840	
DKTN3					.822	
DKTN2					.784	
DKKT2						.810
DKKT3						.808
DKKT1						.803

Source: Analytical results of the author

To study the influence of factors on public investment outcomes in educational institutions, the study uses the least square method (OLS) for analysis. Firstly, the researchers conducted an exploratory factor analysis of dependent variables; the results of public investment in educational institutions are as follows:

**Table 5**  
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.709
Bartlett's Test of Sphericity	Approx. Chi-Square	279.154
	Df	3
	Sig.	.000

Source: Analytical results of the author

KMO and Bartlett's test results in the above table show that this database is completely suitable because the test value reached 0.709 (in the range of 0.5 to 1) with statistical significance at 1% (Sig. = 0.000 < 0.005). So, the author's research model is appropriate. For factor analysis, the study used specific values (Eigenvalue) to determine the number of factors:

**Table 6**  
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.160	72.006	72.006	2.160	72.006	72.006
2	.462	15.412	87.417			
3	.377	12.583	100.000			

Source: Analytical results of the author

The study results show that the total "Rotation sums of squared loadings" reached a high level (72.006%), this means that using a factor representing 3 items explained more than 70% of the observed variables.

**Table 7**  
Component Matrix

	Component
	1
DTC2	.865
DTC1	.851
DTC3	.829

Source: Analytical results of the author

Thus, based on Component Matrix from EFA analysis, we have 1 factor created from 3 items, named DTC: the results of Public investment in educational institutions. Then, the team performed multivariate regressions to analyze the extent of the influence of the independent variable on the dependent variable.

Testing the suitability of the model

**Table 8a**

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.837 <sup>a</sup>	.700	.694	.3032

a. Predictors: (Constant), DKTN, QLDT, NLQL, CSPL, TCTH, DKKT

Source: Processing results from survey data

With the adjusted R Square = 0.694, said that the independent variables in the model explained about 69.4% of the dependent variables.

**Table 8b**

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.612	6	10.102	109.889	.000 <sup>b</sup>
	Residual	25.924	282	.092		
	Total	86.537	288			

a. Dependent Variable: DTC

b. Predictors: (Constant), DKTN, QLDT, NLQL, CSPL, TCTH, DKKT

Source: Processing results from survey data

The results from Table 8b above show:

With a coefficient of Sig = 0.000; F = 109.889 test, so the research model is suitable.

**Table 9**

The summary of the regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.814	.222		-3.664	.000		
	NLQL	.238	.018	.430	13.111	.000	.985	1.015
	CSPL	.187	.038	.166	4.972	.000	.958	1.044
	TCTH	.276	.028	.332	9.861	.000	.938	1.066
	QLDT	.233	.018	.441	13.128	.000	.940	1.064
	DKKT	.211	.037	.205	5.729	.000	.832	1.202
	DKTN	.152	.038	.145	3.994	.000	.811	1.233

a. Dependent Variable: DTC

Source: Processing results from survey data

From the results of Table 9, we understand that all variables in the study are statistically significant with an error of 0.1, factors influencing the results of public investment in education in Vietnam to different degrees. Specifically:

Between the factors studied, the factor that has the most influence on the results of public investment in educational institutions is based on the object's evaluation surveyed is a public investment management factor (QLDT) with a Standardized Coefficients of 0.441, the author's study results also support the views of previous studies when the results of projects will be better if the previous investment project preparation process is well done from the project formulation process analyze, approve the project to select the contractor that meets the project implementation requirements, decentralizing public investment management to implement reasonably to avoid overlapping, causing difficulties to the implementation process, avoiding affecting the project implementation schedule. Besides, the appropriate allocation of public investment will help reduce progress issues, on the implemented capital for the project. This will contribute to ensuring better results of the project.

Other factors are also positively affecting public investment outcomes in educational institutions in Vietnam, however, the level of influence is different, namely, the Standardized Coefficients of the NLQL variable is 0.43, which shows the relatively clear level of influence of the human resource factor, indeed, the capacity of the project developers greatly determines the quality of the projects directly affect the results of project implementation meeting the requirements or not. From the techniques used to carry out the project, the management capabilities of the investor, the implementing units, financial capacity of the units that meet to reciprocate capital when implementing the project. The Standardized Coefficients of the TCTH variable is 0.332, which shows that, if the project planning process is good, the ability to raise and use the capital

for the project is good, the progress of the required content will positively affect investment results; Standardized Coefficients of the DKKT variable is 0.205, and Standardized Coefficients of DKTN variable is 0.145.

The factors that most strongly influence the results of public investment in educational institutions seem to be those that can be regulated by humans, directly related to human operations and activities. Therefore, the recommendations of the research team on proposals to further improve public investment outcomes in educational institutions will revolve around these factors based on the results of the author's analysis. Objective factors such as natural conditions of the research team will not focus on the proposal in the content of this study.

## 5. Conclusions

Based on the results of the analysis, the research team proposes some recommendations that contribute to improving the results of public investment in educational institutions in Vietnam, specifically as follows: Human resources involved in the steps of public investment activities in educational institutions need to be adequately trained in the field of responsibility assigned from state management officials to implementing units officials to real units show up. The goal of implementing this solution is to ensure that projects are implemented effectively, a well-qualified professional team will minimize risks for investment activities. To accomplish this task need:

Firstly, for government officials, needing specialization in the work, ensuring each manager is a good expert in the field they are in charge. Each manager needs to ensure responsibility in the work assigned.

Secondly, for the implementing units, it is necessary to improve the professional skills for the staff participated in project implementation from the stage of investment preparation to the phases of investment implementation and operation of investment results. Implementation staff must always update the latest knowledge on science and technology, information technology and foreign languages to meet job requirements.

Besides, the rational use of invested resources is also an important solution that needs to be taken into account when participating in public investment activities. The approval of projects must ensure compliance with the provisions of law, giving priority to key projects according to the approved plans and plans, avoiding loss and waste in investment.

This study analyzes the factors affecting the results of public investment in educational institutions in Vietnam from the perspective of units joined in investment activities, therefore, the individual's subjective judgment of individuals - This is also the weakness of the research. The research team will continue to handle research on the factors affecting public investment outcomes in educational institutions in Vietnam. Use published secondary data to enable a more diverse view of research.

## Acknowledgement

This work was supported by the Vietnamese Ministry of Education and Training under the Research Project B2020.KHA.01 "Public investment management in public-autonomy universities in Vietnam".

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