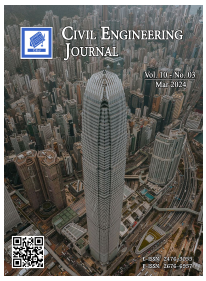
Available online at www.CivileJournal.org

Civil Engineering Journal

(E-ISSN: 2476-3055; ISSN: 2676-6957)

Vol. 10, No. 03, March, 2024



The Effectiveness of the Procurement at the Construction Services Selection Implementation Center

Sofian [1], H. Parung [1], S. Burhanuddin [1], R. Arifuddin [1*]

[1] *Department of Civil Engineering, Faculty of Engineering, Hasanuddin University, Gowa, Indonesia.*

Received 11 August 2023; Revised 08 February 2024; Accepted 16 February 2024; Published 01 March 2024

Abstract

The construction industry still faces various challenges in some developing countries, and one of the problems is the procurement of goods and services. The allocation of public procurement funds is significant to the national GDP. It is essential to conduct comprehensive research on government procurement in the construction industry in Indonesia due to the rapid growth of the construction industry in the last decade. This research focuses on the procurement of construction goods and services in the Ministry of Public Works and Housing by looking at the perception of the government as the project owner. This research aims to identify a model of critical success factors to improve public procurement performance in the construction industry from the government's perspective. The research method includes two stages, namely, the development of critical success, which consists of crucial factors and indicators that affect the performance of public procurement in the construction industry. It is a literature study of relevant previous research results from various countries that affect these critical success factors. Then, the second stage is a survey of experts' perceptions through questionnaires. The questionnaire data analysis used SEM-PLS software to quantify the relationship model of critical success factors to improve the performance of government procurement of goods and services in the construction industry. Data processing results include: business process factors affect 97.1%, regulatory factors affect 90.1%, information system factors affect 63.1%, human resource factors affect 56.1%, organizational factors affect 46.1%, and monitoring and evaluation factors affect 38%.

Keywords: Construction Industry; Critical Succes Factors; Government; Public Procurement.

1. Introduction

Construction is one of the most significant generation divisions in the world, and its advancement impacts the business era, the dynamism of materials, and the improvement of the fundamental framework [1, 2]. All sorts of construction ventures constitute one of the fundamental civilization angles and headway in society, frequently alluded to as the civilization of numerous countries, counting the inventiveness, offices, and landmarks [3]. Unfortunately, the growth of the construction industry in some developing countries still experiences various challenges, including low productivity, low quality, unskilled labor, and project delays [4, 5]. One of the biggest challenges within the development industry is the delay in the procurement handle [6]. In comparison, the procurement process in the construction industry is one of the most significant processes influencing the growth of the industry [7]. Procurement techniques can be widely considered in developing and designing industries whose primary purpose is administration [8–10]. The procurement process in the construction sector is the process of purchasing goods, services, or works that includes two types: (i) public procurement and (ii) private procurement [11, 12].

* Corresponding author: rosmarianiarifuddin@unhas.ac.id

http://dx.doi.org/10.28991/CEJ-2024-010-03-013

© 2024 by the authors. Licensee C.E.J, Tehran, Iran. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (http://creativecommons.org/licenses/by/4.0/).

Procurement issues in the construction industry have been investigated in several developing countries. In Niger, strategies to eliminate and reduce corrupt behavior in procuring goods and services in the construction industry have been addressed by adopting digitalization through e-procurement technology. However, the implementation of e-procurement still needs more technical experts and more investment in e-procurement technology [13]. In India, the main deviation in public procurement in the construction industry is transparency, followed by the availability of professional standards, a fair procurement process, contract monitoring, and regulatory and procedural are still challenges to create effective public construction procurement [14]. In Portugal, general construction procurement by the government has been obliged to use e-procurement, which has increased the transparency of the process, the impact on competition, and the impact on bureaucracy. Thus, they have a more straightforward decision-making structure that can reduce the difficulty of e-procurement implementation [15]. Ghana's public procurement barriers include administrative, procedural, compliance, and contract monitoring irregularities [16]. Construction material procurement contracts in Columbia's public procurement still predominantly use traditional construction methods that require standardization in procurement management to ensure adequate supply chain processes and best prices with high-quality requirements in line with stakeholder needs [1].

Similarly, over the past five years, Indonesia's construction sector has become a driver of economic growth due to significant government spending on infrastructure development. Infrastructure development is increasing evenly throughout Indonesia. Increased and massive infrastructure development certainly requires a procurement process in the construction sector with improved performance. The procurement development of construction project units in Indonesia is still generally moo, at level two out of five, requiring assistance capacity-building programs for obtainment units in Indonesia and progressed obtainment arranging as the primary and most critical portion of the acquirement preparation [5]. Open development acquirement in Indonesia stipulates seven standards for acquirement execution, to be specific: (i) proficient, (ii) commonsense, (iii) straightforward, (iv) open & competitive, (v) reasonable, and (vi) responsible. This paper is an early-stage inquiry to assess the use of open acquirement principles within the construction division [17].

Research related to the existence of government procurement units in public procurement in the construction sector has developed models and measured maturity indices on the capabilities of procurement units as implementers. However, increasing the capacity of the procurement unit must be accompanied by an increase in the performance of the procurement process itself. Further research is needed to look at more comprehensively the behavior and correlation of supporting factors or critical success factors that affect the performance of the public procurement process in Indonesia. This study follows up on the research gap on critical success factors that influence the improvement of public procurement in the Indonesian construction sector. The study's results aim to provide information to the Indonesian government about mitigating the risks associated with implementing procurement in demanding infrastructure projects throughout Indonesia.

2. Literature Review

2.1. Public Procurement

Public procurement is self-explanatory because the definition is clear: public means government, and procurement means purchase or purchase. Besides, the reason for public procurement is the method of acquiring products, administrations, and works by the government and state-owned companies [18]. Hence, open procurement may be a handle in which public organizations obtain or buy items within the frame of products, services, or sometimes a combination of merchandise and administrations [19]. Common procurement standards oversee open obtainment administration, counting setting up a system for executing a code of conduct for all parties explicitly included or in a roundabout way in actualizing open procurement. The beneficiaries of a public procurement system are the entire population of a country through the public goods and services provided, including transport systems, public utilities, education systems, and health and other public services and facilities [20]. State-funded public sector procurement, its principles, implementation mechanisms, and methods are regulated by each country [21, 22]. The legal regulation for public sector procurement in Indonesia is through the Presidential Regulation of the Republic of Indonesia Number 12 of 2018 on Government Procurement of Goods or Services.

2.2. Public Procurement in Construction Industry in Indonesia

The construction industry is a fundamental portion of the acquirement framework, with the standard definition of acquirement as securing products, administrations, or development components from third parties at the leading price, and within the adjusted amount, with the proper rights, time, and put [23]. The construction industry with infrastructure building products for the public has been regulated through the Minister of Public Works and Public Housing Regulation No. 12 of 2021.

2.3. Construction Service Selection Center (CSSC)

Construction Services Selection Implementation Centre has been established in 34 provinces in Indonesia to replace the Procurement Service Unit. With work units, independent human resources, and better business processes, the process

and results of public procurement are expected to be more effective, efficient, transparent, quality, and accountable. The establishment of CSSC is a step by the Ministry of Publics Work and Housing to implement nine strategies to prevent irregularities in the procurement of goods and services, namely (1) reorganizing the organizational structure of the PSU and PGS working group; (2) strengthening human resources; (3) improving the mechanism for preparing the Own Estimate Price; (4) fostering the provision of services both contractors and consultants; (5) inspection of work results involving the Development Finance Supervisory Agency; (6) reducing risks in organizational units, centers, and work units; (7) establishment of an internal compliance unit; (8) establishment of an inspectorate for investigation and strengthening the capacity of auditors; and (9) continuous monitoring of fraud prevention tools with information technology. To improve the standards and professionalism of goods and services procurement to encourage the acceleration of reliable infrastructure development, CSSC has enormous tasks and responsibilities. Priorities and strategies are used to optimize the performance of the procurement process, including planning and development of procurement human resources, integration of the planning process with procurement implementation, availability of SOPs in implementing the strategy, having measurable performance targets, having a map of potential risks, developing information systems, and independence and freedom from corruption, collusion, and nepotism.

2.4. Critical Success Factors for Public Construction Procurement

The definition of critical success factors is an essential component for proper project execution that must be done because, without this component, the project will not be successful or will not succeed in achieving specific targets or goals in a project or work. Before starting a project, it is imperative to identify these CSFs. According to Mojumder et al. [24], "*The importance of identifying those relatively few variables that are crucial to the attainment of strategy, goals, objectives then is ultimately derived from limited information processing ability of the manager. We call these crucial variables, critical variables, or critical success factors*".

The results of the literature review obtained critical success factors of public procurement in the construction industry from several countries found that regulatory factors (XR) affecting the implementation of public procurement in construction projects include: (XR1) Availability of Procurement Regulations; (XR2) Compliance with Procurement Regulations; and (XR3) Understanding of Procurement Regulations [14, 16]. Furthermore, Organisational Factors (XO) are concluded to affect the procurement of goods and services in the construction industry consisting of (XO1) Availability of organizational culture with anti-corruption integrity in the procurement unit; XO2) Availability of Key Performance Indicators (KPIs) for the procurement unit; (XO3) Developing an adaptive and responsive organizational attitude; and (XO4) Support for the procurement team from top management [25].

3. Method

3.1. First Stage

The first stage is the development of critical success factors consisting of factors and indicators that improve public construction procurement performance. The development of critical success factors was carried out with a literature study on relevant previous research. The review results of critical success factors are then grouped based on factors and indicators. Furthermore, grouping is done based on substance. Furthermore, indicators that affect each of these factors are developed.

3.2. Second Stage

The second stage: A perception survey of critical success factors was conducted based on the results of the first stage, namely the development of critical success factors that affect the improvement of public construction procurement performance. Perception survey via questionnaire involving 263 public construction procurement experts. The experts selected as respondents are personnel of the procurement unit or Construction Service Selection Centre (CSSC) Ministry of Public Works and Housing in 34 provinces. Expert selection is based on > 5 years of experience in public construction procurement. The scale for measuring the significance of the influence of each critical success factor in the questionnaire using a Likert scale includes: (i) score 5: very significant, (ii) Score 4: Significant, (iii) Score 3: Neutral, (iv) Score 2: Not significant, (v) Score 1: Very insignificant. SEM-PLS was used to analyze the quantifiable relationship of critical success factors consisting of factors and indicators (X) on the improvement of public construction procurement performance carried out by the procurement unit or Construction Service Selection Center of the Ministry of Public Works and Housing (Y).

The overall conceptual framework of the research is depicted in Figure 1.

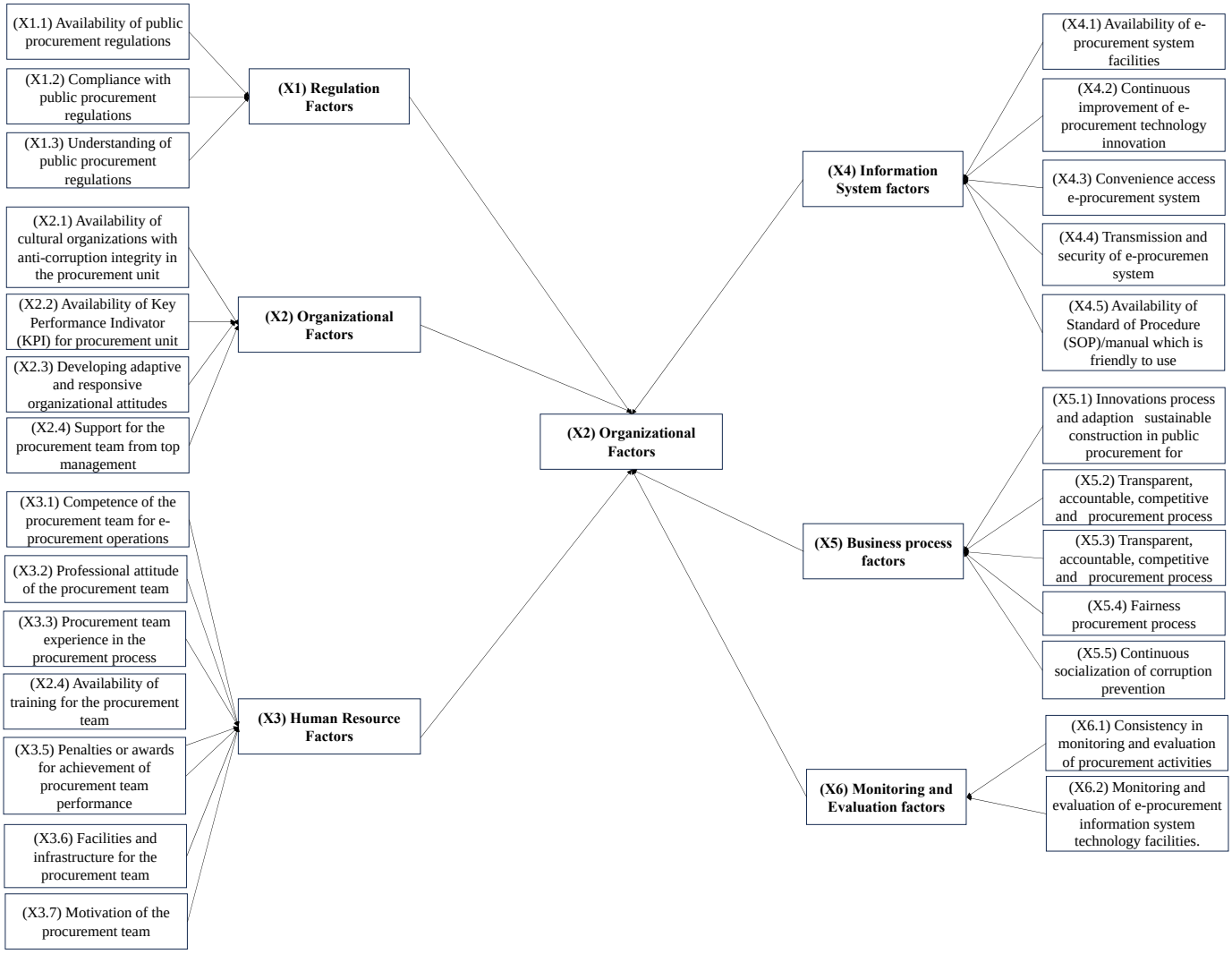


Figure 1. Research Conceptual Framework

Furthermore, the operational framework of the study is shown in Figure 2.

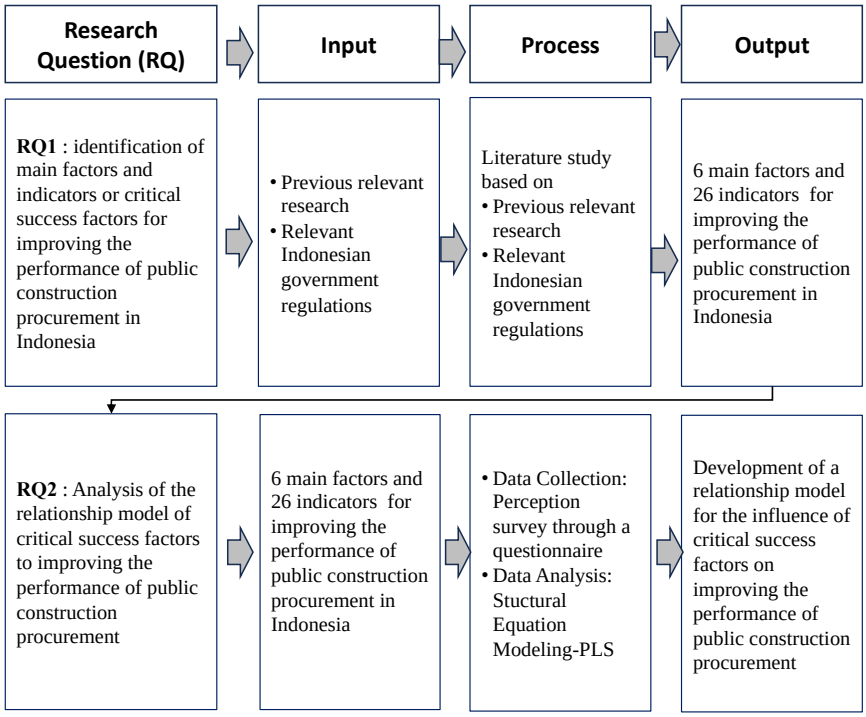


Figure 2. Research Operational Framework

4. Results and Discussion

4.1. Profile of Respondent

Furthermore, an analysis is carried out regarding the profile of respondents, which includes: (i) the total amount of respondent data collected, (ii) the amount of respondent data based on regional division, (iii) the amount of data based on age grouping, (iii) the amount of respondent data based on position. The results of the respondent's data profile are outlined in Table 1.

Table 1. Profile of Respondent

No	Location	Amount of Data		Experience			Education		
		SUM	%	< 5 years	>5 years	>15 years	S1	S2	S3
1	Western Indonesia	121	46,01%	64	46	11	60	59	2
2	Central Indonesia	102	38,78%	45	45	12	68	32	2
3	Eastern Indonesia	40	15,21%	11	23	6	33	7	0
	Total	263	100%	120	114	29	161	98	4

Based on the data profile analysis, the data is almost evenly distributed throughout Indonesia, so it can be concluded that the data already represent Indonesia as a whole. Based on experience in the public construction procurement process, 54.4% were obtained above five years. It shows that experience.

4.2. Structural Equation Modelling (SEM) Analysis

4.2.1.Validity and Reliability Test

Discriminant Validity is calculated to decide the esteem of Discriminant Valitidy (Fornell Lacker Basis), which is the esteem of the relationship between the variable itself and the variable with other factors, should not be littler than other factors. The substantial respect must be more prominent than the esteem of the variable, and the other factors appear in Table 2.

Table 2. Determinant Validity Count Value (Fornell Lacker Criterion)

Variable	XR	XO	X3	X4	X5	X6	Y
X1	**0.850**						
X2	0.737	**0.816**					
X3	0.719	0.753	**0.820**				
X4	0.655	0.680	0.774	**0.830**			
X5	0.683	0.800	0.778	0.705	**0.751**		
X6	0.405	0.461	0.578	0.644	0.579	**0.952**	
Y	0.630	0.672	0.705	0.662	0.745	0.503	**1,000**

Reliability Number Comes about the comes about of Reliability Checks (Composite Unwavering quality and Cronbach's Alpha), characterized as the instrument's viability in measuring the esteem of its pointers. The reliability test is carried out by looking at the Composite Reliability esteem of the build marker. The Reliability Tally Esteem (Composite Reliability and Cronbach's Alpha) will be palatable in case ≥ 0.7.

Based on the calculated results, it has shown that the computed value of Reliability (Cronbach's Alpha and Composite Reliability) for all constructs is more significant than 0.7, which indicates that the instrument has met the reliability criteria so that it can be said to be reliable and powerful to use in research.

This Reliability Test measures the consistency of the questionnaire, namely the indicators of each variable or construct. In this study, variable Y only has one needle, so there is no value for the reliability calculation results. Meanwhile, Discriminant validity is the measurement of indicators with the indicators themselves, which is carried out to ensure that each concept of each latent variable is different from other variables. For variable Y, this study only consists of 1 indicator, so there is no value for the validity calculation results (Table 3).

The results of the validity calculation were carried out utilizing the Concurrent Legitimacy test (Normal Fluctuation Extricated). This method is to degree the Average Variance Extricated esteem with the estimation esteem (Average Variance Extricated) must meet each variable has affection, to be specific ≥ 0.5. Based on the calculated results in Table 4, the Merged Validity test (Average Variance Extricated) for all develops is more noteworthy than 0.5, so the assessed demonstration meets the discriminant validity criteria.

Table 3. Value of Discriminant Validity (Cross Loading)

	X1	X2	X3	X4	X5	X6	Y
X1.1	0.856	0.597	0.57	0.526	0.544	0.323	0.488
X1.2	0.898	0.645	0.615	0.596	0.619	0.357	0.587
X1.3	0.793	0.628	0.647	0.545	0.571	0.351	0.523
X2.1	0.706	0.793	0.664	0.595	0.641	0.416	0.592
X2.2	0.506	0.746	0.563	0.425	0.581	0.217	0.49
X2.3	0.57	0.806	0.628	0.442	0.638	0.323	0.511
X2.4	0.565	0.793	0.692	0.575	0.6	0.352	0.485
X2.5	0.514	0.761	0.609	0.515	0.608	0.354	0.498
X2.6	0.575	0.811	0.651	0.562	0.624	0.436	0.539
X3.1	0.598	0.699	0.798	0.596	0.606	0.394	0.56
X3.2	0.63	0.749	0.802	0.603	0.718	0.365	0.603
X3.3	0.562	0.598	0.799	0.591	0.62	0.417	0.542
X3.4	0.489	0.504	0.736	0.636	0.577	0.479	0.492
X3.5	0.564	0.67	0.76	0.603	0.661	0.436	0.559
X3.6	0.527	0.566	0.744	0.64	0.573	0.558	0.501
X3.7	0.529	0.593	0.803	0.558	0.658	0.524	0.567
X4.1	0.515	0.554	0.641	0.857	0.52	0.495	0.494
X4.2	0.472	0.501	0.621	0.84	0.494	0.516	0.473
X4.3	0.549	0.551	0.627	0.818	0.572	0.427	0.554
X4.4	0.649	0.648	0.692	0.837	0.628	0.479	0.618
X4.5	0.523	0.485	0.581	0.83	0.506	0.55	0.503
X4.6	0.53	0.549	0.633	0.857	0.582	0.586	0.59
X4.7	0.495	0.475	0.62	0.787	0.551	0.568	0.508
X4.8	0.586	0.608	0.701	0.815	0.645	0.643	0.613
X5.1	0.498	0.57	0.613	0.622	0.769	0.494	0.594
X5.2	0.634	0.722	0.724	0.578	0.894	0.434	0.649
X5.3	0.679	0.777	0.777	0.624	0.914	0.475	0.697
X5.5	0.403	0.483	0.545	0.411	0.707	0.418	0.485
X6.1	0.386	0.4	0.551	0.588	0.522	0.954	0.487
X6.2	0.384	0.456	0.551	0.64	0.525	0.95	0.47
Y	0.63	0.664	0.705	0.662	0.741	0.503	1

Table 4. Value of Discriminant Validity (Cross Loading)

Variable	Cronbach's alpha	rho_A	Composite Reliability	AVE
X1	0.807	0.815	0.886	0.723
X2	0.876	0.878	0.888	0.572
X3	0.891	0.893	0.892	0.674
X4	0.936	0.939	0.947	0.69
X5	0.841	0.861	0.857	0.563
X6	0.897	0.898	0.951	0.907

4.2.2. Model Evaluation Results

The results of processing questionnaire data with SEM-PLS software obtained inner model test with R-Square shown in Table 5.

Table 5. Inner Model Test (R-Square)

Y	R-square	Adjusted R-square
	0.609	0.600

Based on the table above, it can be seen that the R-Square for improving the performance of public construction procurement at the Construction Service Selection Center (CSSC) is 0.609 or 60.9%. Based on the table above, the R-Square value is in the range of 50-75 (substantial), which means it has good goodness of fit.

The results of processing questionnaire data with SEM-PLS software obtained inner model tests with Path Coefficients are shown in Table 6.

Table 6. Inner Model Test (Path Coefficients)

	X1	X2	X3	X4	X5	X6	Y
X1							0.126
X2							0.053
X3							0.089
X4							0.166
X5							0.407
X6							0.034
Y							-

The direction of variable influence can be derived from the results of this study as follows.

- X1 (Regulation) has a POSITIVE effect on Y (Procurement Performance)
- X2 (Organization) has a POSITIVE effect on Y (Procurement Performance)
- X3 (Human Resources) has a POSITIVE effect on Y (Procurement Performance)
- X4 (Information Systems) has a POSITIVE effect on Y (Procurement Performance)
- X5 (Business Process) has a POSITIVE effect on Y (Procurement Performance)
- X6 (Monitoring & Evaluation) has a POSITIVE effect on Y (Procurement Performance)

These results show that variables X1 (regulation), X2 (organization), X3 (human resources), X4 (information systems), X5 (business processes), and X6 (monitoring & evaluation) show a positive influence on Y (performance of goods and services procurement). These results indicate that these six variables are Critical Success Factors for Goods and Services Procurement in Indonesia.

4.2.3. Model Results: Inner Model Test (Significance T-Statistic)

The results of processing questionnaire data with SEM-PLS software obtained inner model test with Significance T-Statistic shown in Table 7.

Table 7. Inner Model Test (Significance T-Statistic)

	Real Sample (O)	Sample Average (M)	Standard Deviation (STDEV)	T-Statistic (/STDEV|)	P-values	
X1 → Y	0.901	0.891	0.07	2.713	0.003	Positive
X2 → Y	0.461	0.471	0.072	2.027	0.021	Positive
X3 → Y	0.561	0.611	0.082	2.894	0.029	Positive
X4 → Y	0.631	0.671	0.092	2.775	0.038	Positive
X5 → Y	0.971	0.941	0.063	3.118	0.001	Positive
X6 → Y	0.380	0.310	0.075	2.039	0.049	Positive

Testing the primary speculation appears that the relationship between administrative factors and the execution of the Construction Project leads to a way coefficient esteem of 0.901 with a t-value of 2.713. The t-value is more prominent than the t table (1.960), and the P-esteem is less than 0.005. This result means that control includes a positive and noteworthy relationship with progressing Construction Services Selection Implementation Centre's capacity to become a solid acquirement specialist in Indonesia.

Testing the second hypothesis revealed that the relationship between organizational variables and construction project performance yielded a path coefficient value of 0.461 and a t-value of 2.027. The obtained t-value is greater than

the t-table (1.960), and the p-value is less than 0.005. This result means the organization is building positive and meaningful relationships to improve Construction Services Selection Implementation Centre's ability to become a trusted sourcing agent in Indonesia.

The results of testing the third hypothesis show that the relationship between the Human Resources variable and the performance of the Construction Project Procurement leads to a path coefficient value of 0.561 with a t value of 2.894. The t value obtained is greater than the t table (1.960), and the P value is less than 0.005. This result means that Human Resources (HR) has a positive and significant relationship with improving Construction Services Selection Implementation Centre's ability to become a reliable procurement agent in Indonesia.

The results of testing the fourth hypothesis show that the relationship between the Information System variable and the performance of the Construction Project Procurement leads to a path coefficient value of 0.631 with a t value of 2.775. The t value obtained is greater than the t table (1.960), and the P value is smaller than 0.005. This result means that the Information System has a positive and significant relationship with improving Construction Services Selection Implementation Centre's ability to become a reliable procurement agent in Indonesia.

The results of testing the fifth hypothesis show that the relationship between the Business Process variable and the performance of the Construction Project Procurement leads to a path coefficient value of 0.971 with a t value of 3.118. The t value obtained is greater than the t table (1.960), and the P value is smaller than 0.005. This result means that the Business Process has a positive and significant relationship with improving Construction Services Selection Implementation Centre's ability to become a reliable procurement agent in Indonesia.

The results of testing the sixth hypothesis show that the relationship between the Monitoring & Evaluation variable and the performance of the Construction Project Procurement leads to a path coefficient value of 0.380 with a t value of 2.039. The t value obtained is greater than the t table (1.960), and the P value is less than 0.005. This result means that Monitoring & Evaluation has a positive and significant relationship with improving Construction Services Selection Implementation Centre's ability to become a reliable procurement agent in Indonesia.

4.2.4. Inner Model Test Result (Model Fit)

As a result of this research, we created a model and tested whether the model we created was good. To calibrate the model, the researchers used an internal model test (model fit) (see Figures 3 to 5). The internal model test (model goodness of fit) is a value that indicates how good the investigated model is. Tolerances are measured against the values displayed on NFI in PLS (See Table 8).

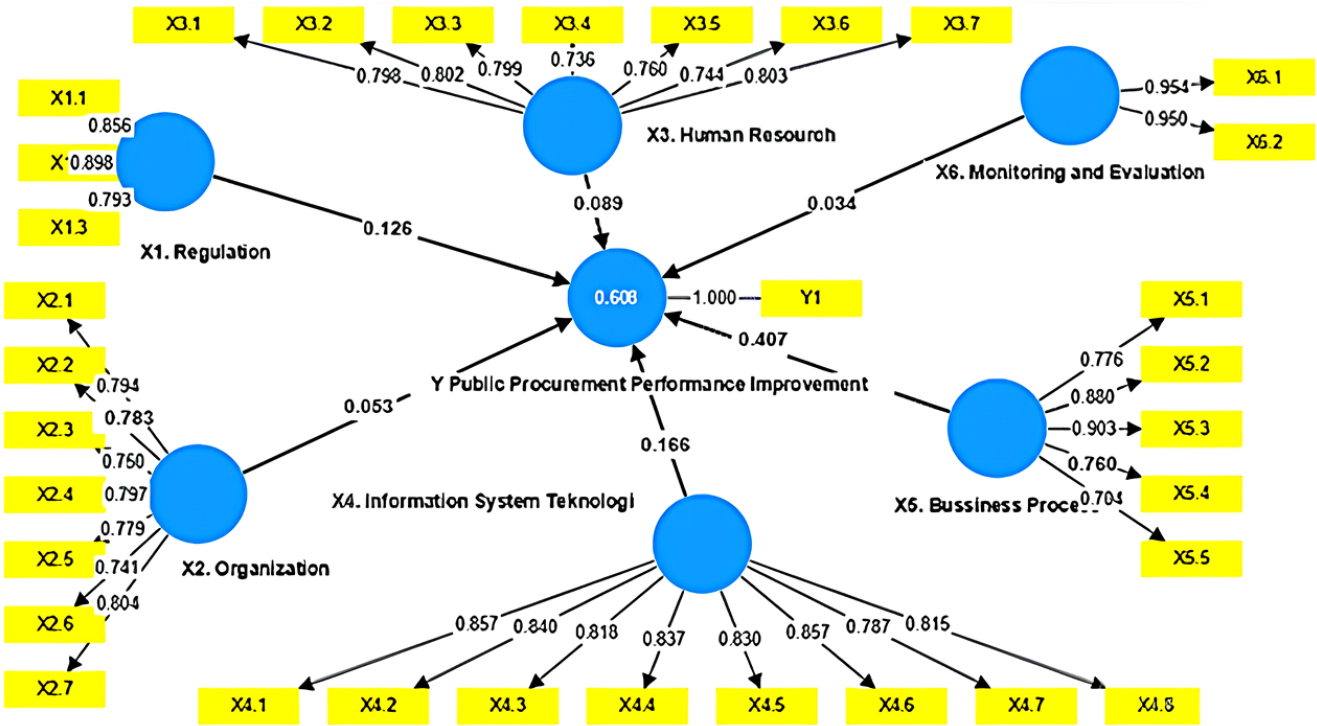


Figure 3. Inner Model Test (Model Fit) for All of Indonesia

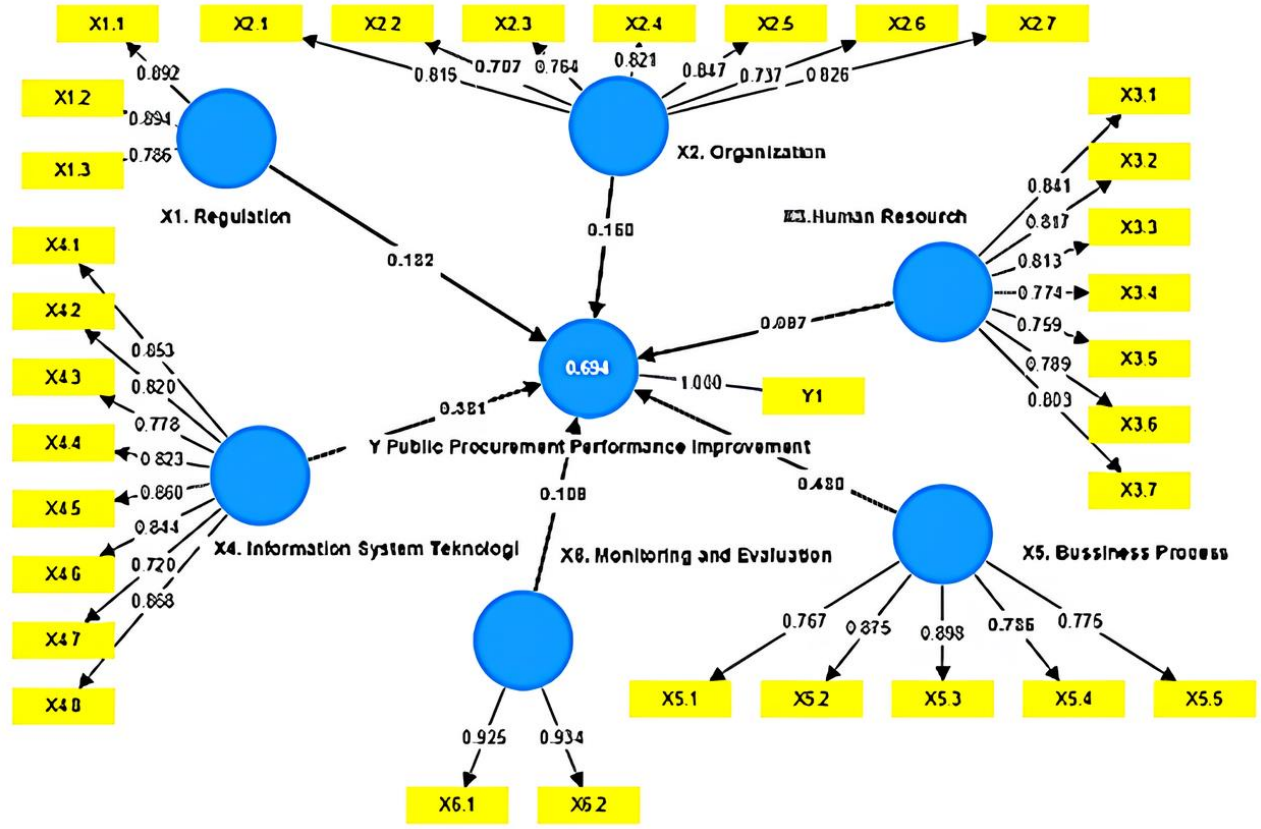


Figure 4. Inner Model Test (Model Fit) for Respondents Data With < 5 Years of experience

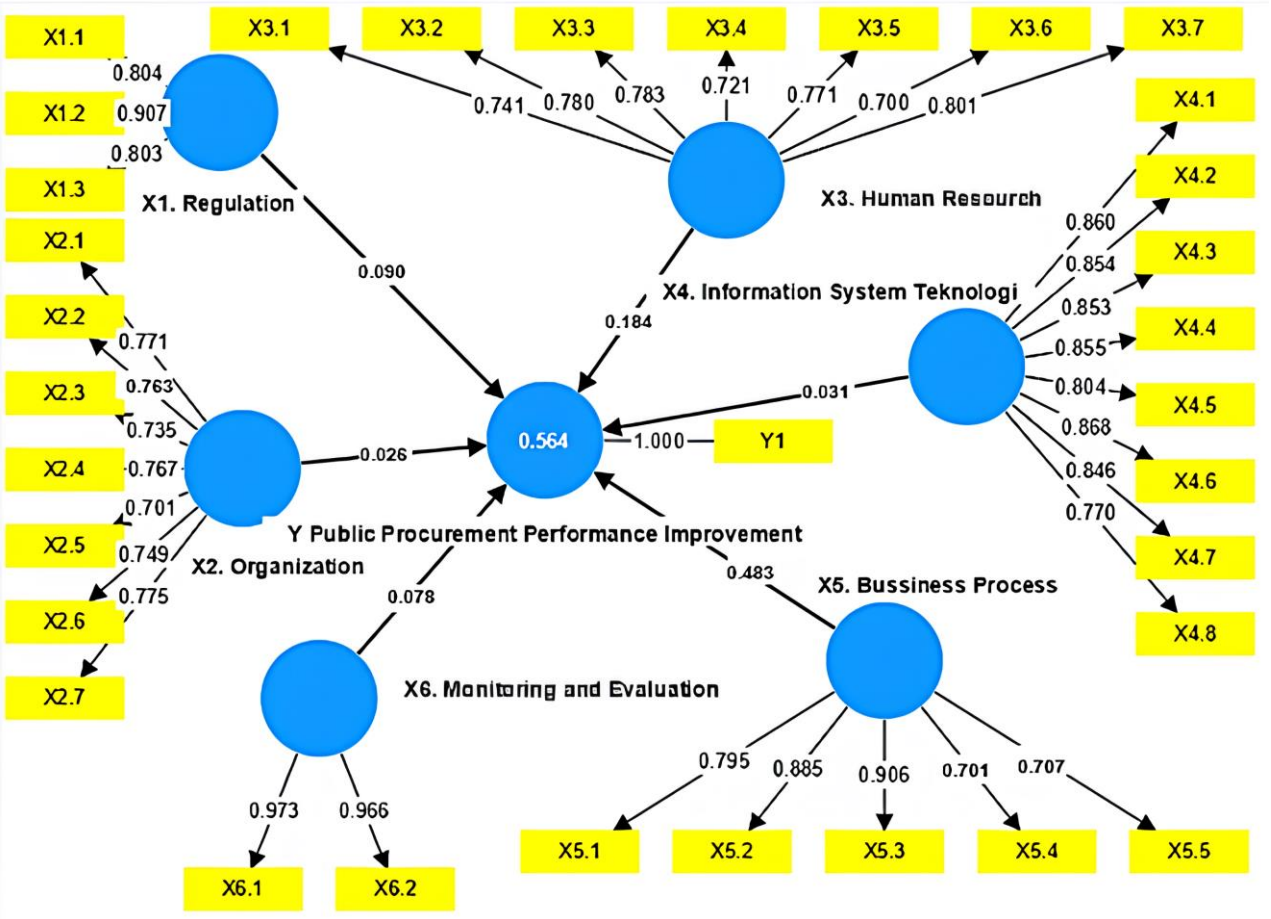


Figure 5. Inner Model Test (Model Fit) for Respondent Data > 5 Years

Table 8. Inner Model Test Value (Model Fit)

	Saturated model	Estimated model
SRMR	0.067	0.067
d_ULS	2,536	2,536
d_G	1,116	1,116
Chi-square	1,606,184	1,606,184
NFI	0.770	0.770

The calculated results show that the Model Fit value is the NFI value = 0.770. It means that the NFI value has shown that the model built is good. The percentage of the model produced is obtained by NFI x 100%, so the ratio of the model built is obtained by NFI = 0.770×100% = 77.0% Fit model. It means that the sustainable construction model built has 77.0% declared fit and can be implemented in the goods and services procurement unit.

4.3. Hypothesis Testing

Hypothesis testing is utilized to test whether there is an impact of exogenous factors on endogenous factors. The test criteria state that if T-Statistic ≥ T-table (1.96), it is famous that exogenous factors have a positive and noteworthy impact on endogenous factors. The results of significance testing are shown in Table 9.

Table 9. Inner Model Test (Significance T-Statistic)

Hypothesis	Factors	Result
1	Regulation	Accepted
2	Organizational	Accepted
3	Human Resource	Accepted
4	Information System	Accepted
5	Business Process	Accepted
6	Monitoring & Evaluation	Accepted

5. Conclusions

The equation obtained from the results of this data analysis is:

$$Y1 = 0.901X1 + 0.461X2 + 0.561X3 + 0.631X4 + 0.971X5 + 0.380X6 \quad (1)$$

The magnitude of the regulatory variable value of 90.1% means that the regulatory variable in this study influences the ability of the Construction Services Selection Implementation Centre to become a reliable procurement agent in Indonesia by 90.1%.

The magnitude of the organizational variable value of 46.1% means that the organizational variables in this study influence the ability of the Construction Services Selection Implementation Centre to become a reliable procurement agent in Indonesia by 46.1%.

The value of the Human Resources variable, namely 56.1%, means that the Human Resources (HR) variable in this study influences increasing the Construction Services Selection Implementation Centre's ability to become a reliable procurement agent in Indonesia by 56.1%. The magnitude of the value of the Information System variable, namely 63.1%, means that the Information System variable in this study influences the ability of the Construction Services Selection Implementation Centre to become a reliable procurement agent in Indonesia by 63.1%.

The magnitude of the Business Process variable value of 97.1% means that the Business Process variable in this study influences increasing the Construction Services Selection Implementation Centre's ability to become a reliable procurement agent in Indonesia by 97.1%.

The value of the Monitoring & Evaluation variable, namely 38%, means that the Monitoring & Evaluation variable in this study influences the ability of the Construction Services Selection Implementation Centre to become a reliable procurement agent in Indonesia by 38%.

The value of the Monitoring & Evaluation variable, namely 38%, means that the Monitoring & Evaluation variable in this study influences the ability of the Construction Services Selection Implementation Centre to become a reliable procurement agent in Indonesia by 38%.

6. Declarations

6.1. Author Contributions

Conceptualization, S., H.P., S.B., and R.A.; methodology, S., H.P., S.B., and R.A.; software, S.; validation, H.P., S.B., and R.A.; formal analysis, S.; investigation, S.; resources, S.; data curation, S. and R.A.; writing—original draft preparation, S. and R.A.; writing—review and editing, S. and R.A.; visualization, S., H.P., and S.B.; supervision, H.P. and S.B.; project administration, S. and R.A.,; funding acquisition, S. All authors have read and agreed to the published version of the manuscript.

6.2. Data Availability Statement

Data sharing is not applicable to this article.

6.3. Funding

The authors received no financial support for this article's research, authorship, and/or publication.

6.4. Conflicts of Interest

The authors declare no conflict of interest.

7. References

[1] Hernandez-Carrillo, C. G., Sarmiento Rojas, J. A., Rueda Varon, M. J., Göiza-Pinzón, F. D., & Toloza-Gordillo, L. M. (2023). Evaluation of preferences for concrete admixtures using statistical perception techniques in the procurement management for the Colombian construction market. Procedia Computer Science, 219, 1977–1984. doi:10.1016/j.procs.2023.01.498.

[2] Alvanchi, A., Shiri, N., & Alikhani, H. (2020). In-depth investigation of project planning and control software package application in the construction industry of Iran. International Journal of Engineering, 33(10), 1817-1825. doi:10.5829/ije.2020.33.10a.01.

[3] Langevin, J., Wen, J., & Gurian, P. L. (2015). Simulating the human-building interaction: Development and validation of an agent-based model of office occupant behaviors. Building and Environment, 88, 27-45. doi:10.1016/j.buildenv.2014.11.037.

[4] Mohd Fateh, M. A., Mohamed, M. R., & Omar, S. A. (2022). The Involvement of Local Skilled Labour in Malaysia's Construction Industry. Frontiers in Built Environment, 8, 1–19. doi:10.3389/fbuil.2022.861018.

[5] Nurhendi, R. N., Khoiry, M. A., & Hamzah, N. (2019). Review on factors influencing labour productivity in construction project. International Journal of Recent Technology and Engineering, 7(6), 837–844.

[6] He, C., Milne, A., & Ataullah, A. (2023). What explains delays in public procurement decisions? Economic Modelling, 121, 106201. doi:10.1016/j.econmod.2023.106201.

[7] Abduh, M., Sukardi, S. N., Wirahadikusumah, R. D., Oktaviani, C. Z., & Bahagia, S. N. (2023). Maturity of procurement units for public construction projects in Indonesia. International Journal of Construction Management, 23(13), 2171–2184. doi:10.1080/15623599.2022.2046941.

[8] Arts, J., Hanekamp, T., Linssen, R., & Snippe, J. (2016). Benchmarking integrated infrastructure planning across Europe–Moving forward to vital infrastructure networks and urban regions. Transportation Research Procedia, 14, 303-312. doi:10.1016/j.trpro.2016.05.024.

[9] Lăzăroiu, G., Ionescu, L., Uţă, C., Hurloiu, I., Andronie, M., & Dijmarescu, I. (2020). Environmentally responsible behavior and sustainability policy adoption in green public procurement. Sustainability (Switzerland), 12(5), 2110. doi:10.3390/su12052110.

[10] Nurmandi, A., & Kim, S. (2015). Making e-procurement work in a decentralized procurement system: A comparison of three Indonesian cities. International Journal of Public Sector Management, 28(3), 198–220. doi:10.1108/IJPSM-03-2015-0035.

[11] Sandi, P. V., Rohman, M. A., & Utomo, C. (2020). A concept to evaluate procurement principles implementation of public construction project in Surabaya. IOP Conference Series: Materials Science and Engineering, 930(1), 012005. doi:10.1088/1757-899X/930/1/012005.

[12] Masudin, I., Aprilia, G. D., Nugraha, A., & Restuputri, D. P. (2021). Impact of E-Procurement Adoption on Company Performance: Evidence from Indonesian Manufacturing Industry. Logistics, 5(1), 16. doi:10.3390/logistics5010016.

[13] Afolabi, A., Ibem, E., Aduwo, E., & Tunji-Olayeni, P. (2022). Digitizing the grey areas in the Nigerian public procurement system using e-Procurement technologies. International Journal of Construction Management, 22(12), 2215–2224. doi:10.1080/15623599.2020.1774836.

[14] Tabish, S. Z. S., & Jha, K. N. (2011). Analyses and evaluation of irregularities in public procurement in India. Construction Management and Economics, 29(3), 261–274. doi:10.1080/01446193.2010.549138.

[15] Costa, A. A., Arantes, A., & Valadares Tavares, L. (2013). Evidence of the impacts of public e-procurement: The Portuguese experience. Journal of Purchasing and Supply Management, 19(4), 238–246. doi:10.1016/j.pursup.2013.07.004.

[16] Owusu, E. K., Chan, A. P. C., Hosseini, M. R., & Nikmehr, B. (2020). Assessing procurement irregularities in the supply-chain of ghanaian construction projects: A soft-computing approach. Journal of Civil Engineering and Management, 26(1), 66–82. doi:10.3846/jcem.2020.11659.

[17] Montalbán-Domingo, L., García-Segura, T., Amalia Sanz, M., & Pellicer, E. (2019). Social Sustainability in Delivery and Procurement of Public Construction Contracts. Journal of Management in Engineering, 35(2), 4018065. doi:10.1061/(asce)me.1943-5479.0000674.

[18] Siyal, S., & Xin, C. (2020). Public Procurement. Global Encyclopedia of Public Administration, Public Policy, and Governance. Springer, Cham, Switzerland. doi:10.1007/978-3-319-31816-5_344-1.

[19] Thai, K. V. (2001). Public procurement re-examined. Journal of Public Procurement, 1(1), 9–50. doi:10.1108/jopp-01-01-2001-b001.

[20] Fourie, D., & Malan, C. (2020). Public procurement in the South African economy: Addressing the systemic issues. Sustainability (Switzerland), 12(20), 1–23. doi:10.3390/su12208692.

[21] Lynch, J., & Angel, J. (2013). Public procurement: Principles, categories and methods. Procurement Classroom Series, 2, Victoria, Canada.

[22] Komakech, R. A. (2016). Public procurement in developing countries: Objectives, principles and required professional skills. Public Policy and Administration Research, 6(8), 20-29.

[23] Ruparathna, R., & Hewage, K. (2015). Review of Contemporary Construction Procurement Practices. Journal of Management in Engineering, 31(3). doi:10.1061/(asce)me.1943-5479.0000279.

[24] Mojumder, A., Singh, A., Kumar, A., & Liu, Y. (2022). Mitigating the barriers to green procurement adoption: An exploratory study of the Indian construction industry. Journal of Cleaner Production, 372. doi:10.1016/j.jclepro.2022.133505.

[25] Sabarish P, Dinesh, S., & Preetha, R. (2016). Literature Study on Socio-Economic Factors of Construction Industry in Developing Countries. International Journal of Science, Engineering and Technology Research, 5(11), 2278–7798.