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ANALYSIS OF DECISION MAKING IN VENDOR SELECTION ON THE TKDN VALUE LIMIT BASED ON THE DECREE OF THE MINISTER OF PUPR NO.602/KPTS/M/2023

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ABSTRACT

This study examines vendor selection in construction projects, emphasizing compliance with Indonesia's Domestic Component Level (TKDN) policy (Ministerial Decree No. 602/KPTS/M/2023), which mandates a 70% TKDN threshold for government-funded projects. Despite TKDN's strategic importance, its weight (11%) trailed quality (43%) in decision-making, as revealed by the Analytical Hierarchy Process (AHP) method applied to PT. Nindya Karya's toll road projects. Primary data from expert questionnaires and interviews identified optimal vendors (e.g., Adhimix for concrete, with 86% material accuracy and 88% TKDN compliance), though cost factors (18–21%) and low TKDN adherence in steel/precast items (14%) highlighted trade-offs. The AHP model demonstrated efficacy in multi-criteria decision-making but relied on manual calculations. Findings advocate balancing TKDN with quality/cost and suggest future research explore automated AHP tools, hybrid MCDM methods, and post-selection performance tracking. The study offers practical guidance for policymakers and contractors to align vendor selection with industrial empowerment goals while ensuring project efficiency.

KEYWORDS *Domestic Component Level (TKDN), Vendor Selection, Analytic Hierarchy Process (AHP)*

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INTRODUCTION

In the process of procurement of goods/services, the use of domestic products as referred to in Government Regulation No. 29 of 2018 concerning Industrial

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Empowerment, in Article 57 concerning the obligation to use Domestic Products (PDN) if it is known that domestic products have a Domestic Component Level (TKDN) value and a Company Benefit Weight (BMP) value of at least 40% (forty percent). Regulations on TKDN are regulated through Article 87, among others, related to the number of domestic components in each good/service, the procedure for calculating it, and the inventory list of domestically produced goods/services (TKDN certified).

As a first step, the Ministry of PUPR created the 2022-2024 Domestic Product Improvement Team (P3DN) on March 21, 2022 through the Decree of the Minister of PUPR Number 280 of 2022. This is strengthened by the issuance of Presidential Instruction No. 2 of 2022 concerning the Acceleration of Increasing the Use of Domestic Products and Products of Micro Enterprises (Pradita & Rahayu, 2025), Small Enterprises and Cooperatives in the Context of the Success of the National Movement, Proud of Made in Indonesia in the Implementation of Procurement of Goods and Services (Purwadaria et al., 2014; Saragih et al., 2023; Susminingsih, 2019).

The Domestic Component Level (TKDN) is the percentage of use of materials or tools that come from within the country, in certain products and services (Devi et al., 2020; Mardiaman & Setiawan, 2023; Ningtyas & Putra, 2024). Including construction work that is required to comply with TKDN provisions (Abduh et al., 2023; Amin et al., 2024; Tribunda & Putra, 2024). In Indonesia, construction work is divided into several sectors, each of which is handled by the Directorate General at the Ministry of Public Works and Public Housing (PUPR) (Anditiaman et al., 2020; B. Berman et al., 2024). For example, the Directorate General of Water Resources of the Ministry of PUPR handles construction work such as dams, irrigation, or buildings directly contaminated with water. Meanwhile, the Directorate General of Highways is responsible for road pavement work, bridge construction, *flyovers*, and landslide handling. In addition, the Directorate General of Cipta Karya and the Directorate General of Housing carry out various construction work. The provisions of TKDN also regulate these consulting services.

The Minister of PUPR has issued Decree No. 602/KPTS/M/2023 concerning the Minimum Limit of Domestic Component Level Value (TKDN) for Construction Services (Kepmen 602/2023), which has been in effect since June 5, 2023. In the construction of the clan building sector of the type of road construction infrastructure, the Minister of PUPR has decided on the minimum limit of the value of the domestic component level of 70%. Based on research (E. K. Berman et al., 2024)An average TKDN value of 60% was obtained for the three road construction projects because several work items using materials did not reach 70%. Changes in the TKDN value for construction work within the scope of PUPR have a significant TKDN value/difference that is quite far from 40% to 70%, which affects the condition of the producer's raw materials.

Many criteria must be included in selecting vendors, including quality and quantity factors. Generally, several criteria affect the selection of vendors, such as quality, cost, delivery, product, service, security, flexibility, responsiveness, and so on. However, the criteria for selecting vendors are at odds with each other. Vendor selection must be carried out in a structured manner because vendor selection

mistakes can disrupt the company's work and operational progress. It is also difficult to find a vendor that can meet the overall criteria or is good in all criteria, but at least it can find the most optimal vendor for the company.

Some previous studies have analyzed the decision to select suppliers based on the criteria mentioned in the previous paragraph. In this study, the decision to select a supplier will be analyzed by adding 1 (one) criterion, namely TKDN. TKDN is the value of domestic components in goods, services, and a combination of goods and services. The involvement of national companies in the supply chain helps increase TKDN. Regarding the definition of TKDN, broadly speaking, it is the percentage value of various components of domestic production.

There are several methods for analyzing vendor selection decisions; one is the AHP (*Analytical Hierarchy Process*) method. The AHP method is simple and can solve problems with multiple criteria, which can be used in vendor selection decision-making. AHP is one method that can help solve complex systems related to decision-making from alternatives and provide the optimal choice. This AHP method was first developed by (Saaty, 1980).

This study aims to determine the actual supplier selection decision system using the AHP (Analytical Hierarchy Process) method and the commonly used criterion approach, with the addition of one additional criterion, namely TKDN (Domestic Component Level). The AHP method was chosen because of its ability to process decisions based on several interrelated criteria and give weight to each criterion that is considered important in selecting vendors. Thus, this study develops a more comprehensive model by including TKDN as a new criterion, considering the importance of using domestic components in government-funded projects.

Some of the limitations applied in this study are as follows: first, this research was conducted in the company environment of PT. NINDYA KARYA is engaged in the field of general contracting. Second, the calculation analysis uses the AHP method to determine the weight of the criteria and the optimal choice of vendors. Third, the respondents involved are parties directly involved in the vendor selection process at the tender process stage. Fourth, the research object includes tender packages on development projects, such as the Construction of the Serang-Panimbang Toll Road Section III (Cileles-Panimbang) Phase 2 Package 1, the Construction of the VVIP Airport Access Road, and the Construction of the Section 6C-1 Road: SP. 3 ITCI Junction 1B Eastern National Axis KIPP.

The benefits of this research can be seen from two aspects, namely the benefits for researchers and the practical benefits for the company. For researchers, the results of this study are expected to add insight and knowledge about the decision-making system in vendor selection by including TKDN criteria, which can be a reference for further development in the field of construction project management. For companies, this research is expected to guide them in choosing vendors that not only meet technical and financial standards but also support the use of domestic components that can strengthen the independence of the domestic industry.

This study makes novel contributions by integrating TKDN as a new criterion in AHP-based vendor selection (Bello, 2003; Handayani & Darmianti, 2017; Messah et al., 2016), quantifying its 11% weight under Indonesia's Kepmen PUPR

No. 602/2023, while revealing practical trade-offs between TKDN, quality (43%), and cost (23%) in toll road projects (contrasting Berman et al., (2024) isolated analysis) through PT. Nindya Karya's case studies (Serang-Panimbang Toll Road) offer sector-specific insights absent in Kenny & Paulus (2023) and Edward et al. (2003). It employs manual AHP with expert weighting (Fitriana & Santosa, 2020), bridging policy (Housing, 2023; Rowin, 2024) and practice by operationalizing 70% TKDN requirements with project constraints, ultimately advancing procurement methodology through its holistic TKDN-AHP integration and empirical trade-off analysis in regulated environments.

RESEARCH METHOD

This research method is carried out in several stages, including research location, data collection, data processing, and using a vendor selection criteria model. This research was carried out on the toll road construction project, which includes the location of Serang-Panimbang in Banten, the VVIP Access Road in the East Kalimantan IKN, and the IC Access Road in the East Kalimantan IKN, with the implementing contractor PT Nindya Karya, which is located at Jl. Letjend MT. Haryono, Kav.22, Jakarta 13630. Data collection is carried out using two types of data sources, namely primary and secondary data. Primary data was obtained through a questionnaire that examined the factors that influenced the decision-making of vendor selection and interviews with parties directly involved in the process at PT Nindya Karya. Meanwhile, secondary data is obtained through literature reviews from books, papers, journals, and other scientific sources, including internet sites, to obtain criteria often used in assessing vendor performance in general and in particular. Data processing is done by converting the raw data obtained into useful information, using certain techniques and methods. One of the vendor selection models used in this study is the Vendor Performance Indicator (VPI), which includes criteria for quality, cost, delivery, flexibility, service, and others, as stated by Rochmoeljati (2012), who quoted from Fun and Hung (1997).

RESULT AND DISCUSSION

In collecting and processing data to analyze vendor selection with a decision-making model, interviews and expert questionnaires are used, where resource persons and interviewers are actors who are usually involved in vendor selection. Suppose the interview is conducted to provide feedback and input/suggestions on the use. In that case, several criteria are established to be used as indicators or materials when considering several selected vendors until the end, when the decision can be made which vendor to use.

Literature studies collected data through reference books, author research, *internet browsing*, and interviews. Data acquisition is based on filling out questionnaires from competent respondents who have a role in selecting vendors. Then, the collected data is processed using the Analytic Hierarchy Process (AHP) method, which uses Microsoft Excel to obtain the weight of each criterion/variable, and then strings together to decide on the selected vendor.

A. Research Data

Table 3.1, Previous Criteria, page 23, shows how this study was prepared to determine the criteria for the level of interest in the selection of vendors using references from previous studies as the basis for indicators in the selection of vendors in this study.

Based on the previous criteria obtained, an evaluation was carried out by experts by juxtaposing each reference source, then the determination of criteria, which is a recombination, and the input of criteria from experts, who are considered necessary to consider several selected vendors in terms of the added criteria. In the process of selecting vendors, a resume of criteria/variables can be presented in Table 1, Determination of Variables of Concrete Work Items, page 34, and Table 2, Determination of Variables of Work Items of Steel Bars, Precast Concrete and Wiremesh, page 35

Table 1. Determination of Concrete Work Item Variables

Criterion Level 1	Sub-Criteria Level 2	Alternative Level 3
Quality	Accuracy of material type	Project A
	Provides consistent material quality/strength	1. Beton Fast Track 7 hari (Fs 45)
	Conformity with brochure specifications	2. Class B concrete (quality K-350), *Slump* 12 ± 2 cm
Cost	Suitable price	
	Payment methods	3. Class B concrete (K-350 quality), *Slump* 18 ± 2 cm
	Discount offered for bookings of certain quantities (≥ 10%)	
Delivery	Delivery timeliness	4. Class C concrete (quality K-250)
	Accuracy of delivery quantity	a. Adhimix
	Transportation system handling capabilities	b. Concrete Building Solutions
	Vendor locations	
Flexibility	Quickly and precisely handle material volume change requests	
	Quickly and accurately handle requests for material order time changes	Project B
		1. Beton fc30 Mpa slump 18 ± 2 cm
	Material availability	2. Concrete fcp 45 MPa
Service	Warranty	3. Concrete f35 Mpa
	Ease of contact	4. Beton fc30 Mpa slump 10 ± 2 cm
	Fast and responsive handling of requests	5. Concrete FC30 MPa Self-Compacting
	Ability to provide information in a clear and easy-to-understand manner	a. Adhimix
		b. Nindya Beton
Company Reputation	Similar work has been done in the last 4 years	

	Experience relates to a claim or claim Frequency of company failure to fulfill orders on time Not blocked	Project C 1. Beton fc30 Mpa slump 10 ± 2 cm 2. Beton FC10 Mpa slump 10 ± 2 cm
TKDN	Utilization of domestic raw materials Use of domestic production equipment Domestic workforce Empowering local vendors	a. Adhimix b. PT. Concrete Fleet Facilities

Table 2. Variable Determination of Steel Rod, Precast Concrete, and Wiremesh Work Items

Criterion Level 1	Sub-Criteria Level 2	Alternative Level 3
Quality	Accuracy of material type Provides consistent material quality/strength Conformity with brochure specifications Dimensionality	Project A 1. BjTS 420B Fin Reinforcement Steel Rod 2. BjTS 420B Fin Reinforcement Steel Rod a. PT. Buana Baja b. Master Steel 3. *PC-I Girder Nominal Span of* 39.00 m *to* 41.00 m, H = 2.10 m, *furnished* a. Wika Beton b. PT. Adhimix PCI
Cost	Suitable price Payment methods Discount offered for bookings of certain quantities (≥ 10%)	
Delivery	Delivery timeliness Accuracy of delivery quantity Transportation system handling capabilities Vendor locations	
Flexibility	Quickly and precisely handle material volume change requests Quickly and accurately handle requests for material order time changes Material availability	Project B 1. BjTS 420B Fin Reinforcement Steel a. PT. Buana Baja b. Master Steel 2. Provision of 30.8 meter span Type 1 Girder Precast Unit 3. Provision of 32.8-meter span U-Type Girder Precast Unit a. Wika Beton b. PT. Adhimix PCI
Service	Warranty Ease of contact Fast and responsive handling of requests Ability to provide information in a clear and easy-to-understand manner	
Company Reputation	Similar work has been done in the last 4 years	

Criterion Level 1	Sub-Criteria Level 2	Alternative Level 3
	Experience relates to a claim or claim Frequency of company failure to fulfill orders on time Not blocked	4. Wiremesh M8 a. PT. Buana Bja b. Master Steel
TKDN	Utilization of domestic raw materials Use of domestic production equipment Domestic workforce Empowering local vendors	Project C 1. BjTS 420B Fin Reinforcement Steel a. PT. Buana Baja b. Master Steel 2. Wiremesh M8 a. PT. Buana Baja b. Master Steel

The distribution of questionnaires was carried out at PT. NINDYA KARYA, with respondents who have filled out the questionnaire, are people with knowledge and experience in the selection process, including the selection of a vendor for a job. The list of respondents who contributed to this study is presented in Table 3 of the Respondent Data List, page 43.

Table 3. List of Respondent Data

It	Position	Education
1	*Vice President Estimating*	S2
2	*Coordinator Estimating*	S2
3	*Vice President, System & Administration, Supply Chain Management*	S1
4	*Project Manager*	S1
5	*Vice President of Production*	S1
6	*Vice President, Assurance, Supply Chain Management*	S2

B. Analysis of Research Results

The results of the criterion weight analysis in the vendor selection hierarchy were obtained from a paired comparison matrix, which is the geometric average result of six respondents. Furthermore, an *eigenvector calculation* was carried out, including each criterion's weight, and a consistency test with the CR value was obtained.

When submitting the questionnaire, use the questionnaire answer sheets and Google Forms. Fill in the questionnaire with twenty-one inter-criteria linking statements at level 1, thirty-three inter-linking statements for concrete work items, thirty-six inter-linking statements for steel bar and girder work items at level 2, twenty-five inter-linking statements for alternative concrete work items, and twenty-six inter-linking statements for alternative steel bar and girder work items

at level 3. Furthermore, the results of the questionnaire responses are presented in the calculation of each level.

C. Criterion Weighting Analysis (Level 1)

The results of the questionnaire distribution, which obtained responses from six respondents to the level of importance of the seven criteria at level 1, were used to respond to related statements, so a pair comparison was obtained, which is the result of the geometric average.

Based on the results of the calculation in Table 4.8 Criterion Weight Value and *Consistency Ratio* Level 1 page 46, the Quality criterion that has the most level of importance in the selection of vendors with a value of 43%, then the Cost criterion with a value of 23%, TKDN with a value of 11%, Flexibility with a value of 9%, Delivery with a value of 5%, and the lowest that has the same level of importance, namely Service and Company Reputation with a value of 4%.

D. Analysis of Sub-Criteria Weighting (Level 2)

The results of the questionnaire distribution obtained responses from respondents to the level of importance of the Level 2 Sub-Criteria. The calculation of the Level 2 Sub-Criteria is carried out in the same way as the calculation of the Level 1 Criteria. The results of the paired comparison matrix, which are the geometric average results of each Sub-Criterion, are obtained.

E. Alternative Weighting Analysis (Level 3)

In the questionnaire distribution results, respondents' responses were obtained on the importance of Level 3 Alternatives that connect each Sub-Criterion. The calculation of Level 3 Alternatives is carried out in the same way as the calculation of Level 1 Criteria and Level 2 Sub-Criteria, obtaining the results of a paired comparison matrix, the geometric average result of each Alternative for each Sub-Criterion.

CONCLUSION

The study applied the AHP method to vendor selection, revealing that quality (43%) outweighed TKDN (11%) in decision-making, with Adhimix and Master Steel chosen for concrete and steel works due to high material accuracy (86%, 76%) but varying TKDN compliance (88%, 14%). While cost factors (price, discounts) held moderate weights (18–21%), the findings suggest ensuring TKDN aligns with quality and cost, endorsing AHP for optimal vendor selection despite manual calculations. Future research should explore automated AHP tools, dynamic weight adjustments, and hybrid MCDM models (e.g., Fuzzy AHP) to improve efficiency. Additionally, the framework could be refined by investigating TKDN policy impacts, cross-industry applicability, post-selection vendor performance, and cost-quality-TKDN trade-offs. Emerging technologies like blockchain may also enhance transparency in vendor scoring.

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