Model for Calculating The Level of Domestic Components in Construction Services Procurement in Badung District

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Abstract. The tender process for government construction services involves determining the Domestic Component Level (TKDN) value for the building, regulated by government policies. While TKDN values are typically associated with goods procurement, they also apply to construction. Key components of government construction service procurement include the RAB (Budget Plan), technical specifications, work implementation methods, and TKDN value. This research, conducted at the UKPBJ Badung Regency, will employ quantitative descriptive methods with data collected through surveys and interviews. Surveys will assess the percentage of TKDN values for each variable used in the calculation of TKDN for construction services. Interviews will be conducted with commitment-making officials or the PPK technical support team to gather insights on TKDN value applications. The variables for calculating TKDN in Badung Regency's government construction services procurement are Unit Analysis of Construction Work, Construction Materials, Labor (Workers, Head Tradesmen, Foremen), Equipment (or Equipment Rental), and the TKDN value set by the Planning Consultant. The model for calculating TKDN value involves analyzing the work unit, considering materials and equipment with a minimum TKDN value of 40%, and labor with a TKDN value of 100% for residents or Indonesian citizens. The overall TKDN value for construction services procurement must be at least 40%. This approach ensures compliance with regulatory standards and supports local industry.

Keywords: Construction Procurement, TKDN Value, Model Introduction

1 Introduction

The procurement of government goods and services involves several stages, including planning, supplier selection, and implementation. The self-estimated price (HPS) is a key component of the planning stage, prepared and determined by the Commitment Making Officer (PPK). Minimizing errors in HPS preparation is crucial to avoid auction failures or unreasonable bid prices. The process also includes calculating the Domestic Component Level (TKDN) (Agung et al., 2019). Minister of Industry (Menperin) Agus Gumiwang Kartasasmita said that products that have a Domestic Component Level

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(TKDN) and Company Benefit Weight (BMP) above 40 percent have the conditions for mandatory purchase. The existence of an application of TKDN for domestic in the pharmaceutical industry is an effort to spur and stimulate domestic actors in Indonesia to build domestic raw materials made by domestic products (Puspitawati, 2023). Challenges in implementing TKDN policies include the limited availability of local resources, access to advanced technology, and budget constraints. Products with a TKDN above 40% are considered eligible for purchase (Fardaniah Risbiani, 2021; Handadi, 2020). Government procurement, including construction services, must account for TKDN values following Law No. 3 of 2014. While many studies have examined TKDN, few have focused on the standards for calculating TKDN in construction services (Presiden Republik Indonesia, 2014). For example, a study on the TKDN in the GKT Poliwangi construction project found a TKDN value of 57.58%, exceeding the minimum requirement of 35%, but lacking evaluation and financial sanctions. The material component has the most significant impact on the final TKDN value (Al-Fa'izah et al., 2017). Further research is needed to develop a model for calculating TKDN in construction services that aligns with the construction AHSP in Badung Regency.

This study aims to analyze the variables required to calculate the TKDN value for government construction services, the percentage assigned to each variable in the TKDN calculation, and the model for calculating the TKDN value for government construction services in Badung Regency. The procurement of government goods/services is an activity to obtain goods/services by ministries/institutions/work units of regional apparatus/institutions, starting from planning needs to completing all activities necessary to obtain goods/services, financed partially or wholly by the State Budget/APBD. Regulation of public procurement of goods and services based on the principles of procurement of goods and services, namely Efficient, Effective, Open and competitive, transparent, fair or non-discriminatory, and accountable (Arifin, 2020). Government procurement of goods/services, hereinafter referred to as Procurement of Goods/Services, is an activity conducted by Ministries/Institutions/Regional Apparatus financed by the State Budget/Regional Budget, from the identification of needs to the handover of work results (Pemerintah Republik Indonesia, 2018). The Domestic Component Level (TKDN) is regulated by Government Regulation No. 29 of 2018 concerning the increase in the use of domestic products, which aims to empower the domestic industry and strengthen the industrial structure. Domestic products are used by the central government, regional governments, business entities, and the community (Al-Fa'izah et al., 2017).

2 Methodology

2.1 Research Design

This research will be conducted at the Goods and Services Procurement Work Unit (UKPBJ) in Badung Regency. A quantitative descriptive method will be used, aiming to explain and summarize various conditions or variables based on what is observed,

thereby highlighting the characteristics or descriptions of these conditions, situations, or variables. The research will involve surveys, observations, and interviews to gather the necessary data for analysis. The survey will measure each predetermined variable and will be conducted with commitment-making officers (PPK) or technical staff involved in the procurement of construction services. Interviews will be conducted to determine the percentage values implemented by the relevant agencies for each variable in the TKDN value calculation. These interviews will also be conducted with PPK or technical staff responsible for the procurement of construction services. Data analysis will be performed using Microsoft Excel, where all components will be entered and analyzed. This research will take place at UKPBJ, Badung, Indonesia.

2.2 Research Data and Data Analysis

The data analysis for this research will involve several steps: 1. Compiling variables related to the calculation of the TKDN value for construction services; 2. Using relevant literature to identify these variables, which will then be incorporated into survey or interview questionnaires; 3. Determining the types of variables used for calculating the TKDN value of construction services; 4. Conducting surveys and interviews with relevant agencies in Badung Regency to determine the percentage used for each variable in calculating the TKDN value; 5. Recapitulating the percentage weight of each variable using mode analysis, which involves identifying the most frequently occurring percentage values during surveys or interviews, and displaying them using Microsoft Excel; 6. Listing the percentage values in the AHSP (Analysis of Unit Price of Work) items according to the results for each variable from the 2023 AHSP of Badung Regency. Labor wages are obtained at the local location and then collected and recorded in a list called the labor unit price list. The unit price in the calculation must be adjusted to field conditions, tool conditions/efficiency, implementation methods, and transportation distance (Nainggolan et al., 2023); 7. Developing a TKDN value calculation model based on mode analysis using the AHSP of Badung Regency. Analysis The mode, median, and mean are statistical techniques used to describe groups, which are based on the central tendency of the group, but of the three types of techniques, the size of the central tendency is different (Spektran et al., 2020); 8. Finally, the TKDN value calculation model will be prepared using mode analysis and integrated into the AHSP using Microsoft Excel.

3 Result and Discussion

3.1 Result

Based on the Analysis of Unit Prices of Work (AHSP), the new Presidential Regulation of the Republic of Indonesia No. 16 of 2018, Presidential Regulation No. 12 of 2021 concerning the Government Procurement of Goods/Services, as well as the Ministry of PUPR's circular letter on the TKDN calculation mechanism and interviews, the variables used in the TKDN calculation can be grouped as shown in Table 1.

Table 1. Variables used in the calculation of TKDN for procurement of construction goods/services

No	Variables	Reference
A	Construction procurement	
X1	Unit analysis of construction work	SE PUPR No. BK.0403-Kd/937 Date 29 September 2022
X2	Construction materials	AHSP Kementerian PUPR
X3	Manpower/workers/head builder/foreman	SE PUPR No. BK.0403-Kd/937 Date 29 September 2022
X4	Equipment / equipment rental	Perpres 12 tahun 2021
X5	Equipment mobilization	Interviews
X6	TKDN value determined by the planning consultant	Interviews

The weight of each variable is used to determine which variables are most significant in calculating the TKDN value for construction services procurement. The results can be seen in Table 2.

Table 2. Assessment result weight taken into account or not taken into account

No	Variable	Weight (N = 11)		Assessment level (%)	
		Yes	Not	Yes	Not
1	Unit analysis of construction work	11	0	100%	0%
2	Construction materials	11	0	100%	0%
3	Manpower/workers/head builder/foreman	11	0	100%	0%
4	Equipment/equipment rental	11	0	100%	0%
5	Equipment mobilization	2	9	18%	82%
6	TKDN value determined by the planning consultant	11	0	100%	0%

The data is calculated weight of each variable was calculated to assess which references are used for the calculation of the TKDN value of construction services. The results of can be seen in Table 3. From the data, the weight of each variable is calculated to obtain the percentage used for calculating the TKDN for construction services procurement. The results of can be seen in Table 4.

Table 3. Reference weight assessment results

No	Variable	Reference	Weight (N = 11)	Assessment Level (%)
1	Unit analysis of construction work	Planners	11	100%
		Permen PU	7	64%
2	Construction materials	Planners	10	91%
		Web. Kemenperin	8	73%

3	Equipment/equipment rental	Planners	10	91%
		Web. Kemenperin	6	55%

Table 4. Assessment result weight percentage TKDN

No	Variable	Bobot (N = 11)		Assessment level (%)	
		PDN > 25% < 40%	TKDN > 40%	PDN > 25%	TKDN > 40%
1	Unit analysis of construction work	6	11	55%	100%
2	Construction materials	1	11	9%	100%
3	Manpower/workers/head builder/foreman	0	11	0	100%
4	Equipment/equipment rental	1	7	9%	64%
5	Equipment mobilization	0	0	0%	0%
6	TKDN value determined by the planning consultant	0	9	0%	82%

The weighting results for the TKDN percentage used to determine the TKDN value are shown in Table 5.4. Among the six variables, most respondents preferred to set the value at >40%, indicating that five of the variables must include TKDN values. The variable “Unit Analysis of Construction Work” has a weight of 55% in the PDN category (Domestic Product) or >25%, meaning that there is a unit analysis of construction work likely to have a TKDN value below 40%. Therefore, it falls into the PDN category with a percentage between >25% and <40%. "Equipment Mobilization" was not considered, so it does not factor into the PDN and TKDN value calculations. From the survey data collected, the highest mode value for each variable used to calculate the TKDN value for construction services work is shown in Table 5. The survey data distributed obtained the highest mode value for each variable. The references used to calculate TKDN value in construction services work as in Table 6. The survey data distributed obtained the highest mode value for the TKDN value of each variable in construction services work as in Table 7.

Table 5. Variable weight mode results

No	Variable	Mode
1	Unit Analysis of Construction Work	Yes (accounted for)
2	Construction materials	Yes (accounted for)
3	Manpower/workers/ ead builder/foreman	Yes (accounted for)
4	Equipment/equipment rental	Yes (accounted for)
5	Equipment mobilization	Not (not calculated)
6	TKDN value determined by the planning consultant	Yes (accounted for)

Table 6. Variable weight mode results

No	Variable	Modus
1	Unit Analysis of Construction Work	Planner Consultant dan Web. Kemenperin (accounted for)
2	Construction Materials	Planner Consultant dan Web. Kemenperin (accounted for)
3	Equipment / Equipment Rental	Planner Consultant dan Web. Kemenperin (accounted for)

Table 7. TKDN value mode result

No	Variable	Modus
1	Unit Analysis of Construction Work	> 25% PDN dan > 40% TKDN
2	Construction Materials	> 40% TKDN
3	Manpower / Workers / Head Builder / Foreman	100% TKDN
4	Equipment / Equipment Rental	> 40% TKDN
5	Equipment Mobilization	NOT (not calculated)
6	TKDN value determined by the Planning Consultant	> 40% TKDN

TKDN Calculation Model Construction work is a part of the work related to the tendering of construction work on the procurement of government goods and services. According to the mode value results for construction procurement, the following model is obtained in Table 8.

Table 8. Construction procurement TKDN value calculation model

No	Description	Kode	Unit	Coef.	Unit Price (Rp)	Cost				PDN / TKDN (%)
						LN = 0%	PDN > 25% < 40%	TKDN > 40%	Total LN + PDN + TKDN	
				1	2	3 = 0 % X 1 X 2	4 = % PDN X 1 X 2	5 = 100 % X 1 X 2	6 = 3 + 4 + 5	7 =8/5
A	Workforce									
	Worker	L.01	OH						= 3 + 4 + 5	=8/5
	Handyman	L.02	OH						= 3 + 4 + 5	=8/5
	Head Builder	L.03	OH						= 3 + 4 + 5	=8/5
	Foreman	L.04	OH						= 3 + 4 + 5	=8/5
	Sum of labor price								8 = Total LN + PDN + TKDN	= Total % TKDN workforce
		Code	Unit	1	2	3	4	5	6	7

						= 0 % X 1 X 2	= % PDN X 1 X 2	= % TKDN X 1 X 2	= 3 + 4 + 5	=8/5
B	Materials									
1	…..								= 3 + 4 + 5	=8/5
2	…..								= 3 + 4 + 5	=8/5
						Etc.				
		Total material price							8 = Total LN + PDN + TKDN	= Total % TKDN material
		Code	Unit	1	2	3	4	5	6	7
						= 0 % X 1 X 2	= % PDN X 1 X 2	= % TKDN X 1 X 2	= 3 + 4 + 5	=8/5
C	Equipment									
1	…..								= 3 + 4 + 5	=8/5
2	…..								= 3 + 4 + 5	=8/5
						Etc.				
	Total price of equipment								8 = Total LN + PDN + TKDN	= Total % TKDN equipment
D								Total PDN/TKDN (A+B+C) (%)		Total grade PDN/TKDN work items (%) = >40%

3.2 Discussion

The variables used in the calculation of TKDN, as derived from the literature, regulations, and interviews, consist of six key variables used as references for calculating TKDN values: a. Unit analysis of construction work; b. TKDN value of materials or construction materials; c. TKDN value of labor (including workers, head masons, and foremen); d. TKDN value of equipment or equipment rental; e. TKDN value of equipment mobilization; f. TKDN value set by the planning consultant.

The weighting results indicate that out of these six variables, "Equipment Mobilization" is not considered significant, with 82% of respondents excluding it from the TKDN calculation for construction services. The remaining five variables are all used in the TKDN calculation, with 100% of respondents incorporating these variables. The weighting results for the references used to determine the TKDN value, as shown in Table 3, indicate that references from planning consultants, Permen PU, and the Ministry of Industry's website have percentages above 50%. This suggests that most agencies rely on these three references to calculate the TKDN value in the procurement of construction services in Badung Regency. The weighting assessment shows that these three references are key justifications for calculating the TKDN value in construction service procurement.

As shown in Table 5.4, the weighting results for the TKDN percentage used to determine the TKDN value reveal that most respondents prefer to set the value at >40%, meaning that five of the variables must include TKDN values. The "Unit Analysis of Construction Work" variable, with a weight of 55% in the Domestic Product (PDN) category (i.e., >25%), indicates that this unit analysis likely has a TKDN value below 40%, thus placing it in the PDN category with a percentage between >25% and <40%.

“Equipment Mobilization” was not considered, so it does not factor into the PDN and TKDN value calculations.

The mode analysis results for the TKDN value used in preparing each unit of work analysis suggest that for the unit analysis, a minimum TKDN value of 25% is required, placing it in the PDN category, and a minimum value of 40% is required for the unit analysis with the TKDN category. Construction materials must have a minimum TKDN of 40%. The TKDN value for labor (workers, head builders, and foremen) is calculated at 100%, following the Ministry of PUPR's circular regarding local labor and local product materials. Equipment or equipment rental must use equipment with a minimum TKDN value of 40%. Equipment mobilization was not considered separately, as it is already included under equipment or equipment rental. The TKDN value determined by the planning consultant must achieve a total value of at least 40% TKDN for the entire construction work calculation.

4 Conclusion

The variables used to calculate the TKDN value for government construction services procurement in Badung Regency include the Unit Analysis of Construction Work, Construction Materials, Labor (Workers, Head Tradesmen, Foremen), Equipment (or Equipment Rental), and the TKDN value determined by the Planning Consultant. The percentage values set for each variable are as follows: a. For the unit analysis of work, a minimum TKDN value of 25% is required to fall into the PDN category, and a minimum of 40% is required for the TKDN category; b. Construction materials must have a minimum TKDN value of 40%; c. The TKDN value for Labor (Workers, Head Builders, Foremen) is set at 100% according to the Ministry of PUPR's circular on local labor and materials; d. Equipment or Equipment Rental must have a minimum TKDN value of 40%; e. Equipment mobilization is not considered separately as it is included under Equipment or Equipment Rental.

The TKDN value determined by the Planning Consultant must total at least 40% for the entire construction work calculation. The model for calculating the TKDN value for government construction services work in Badung Regency involves analyzing the TKDN value based on the work unit analysis, taking into account materials, equipment with a minimum TKDN value of 40%, and labor with a TKDN value of 100% for local residents or Indonesian citizens. The overall TKDN value for government construction services in Badung Regency must meet a minimum of 40%.

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