

Selection of Solid Wheel Train Procurement Vendors at PT Kereta Api Indonesia (Persero) in Bandung Using the Profile Matching Method

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Abstract: PT Kereta Api Indonesia is a State-Owned Enterprise (BUMN) engaged in passenger and freight transportation services using trains. To improve the existing facilities and infrastructure at PT KAI, one of the factors in the procurement of goods and services that can support and support the running of train operations is the solid wheels of the train. In the implementation of the procurement of solid train wheels, PT Kereta Api Indonesia collaborates with several vendors to find the best vendors in the procurement of solid train wheels. The five vendors are PT. IMST, PT. TU, PT. BI, PT. PEI, and PT. IE. In the implementation of the procurement of solid train wheels, there are times when vendors cannot maintain their commitments, which has an impact on ongoing projects. In this study, the author used the Profile Matching Method to determine which vendor has the best rating. Based on the results of research on the five vendors, IMST vendors ranked first with a final result value of 5.71, followed by PEI vendors in second place with a final result value of 5.64, then TU vendors ranked third with a final result value of 5.58, then ranked fourth, namely BI vendors with a final result value of 5.48, and finally ranked fifth, namely IE vendors with a final result value of 4.92. The results of this rating are used as input for the company in determining the main partner and for vendors as an evaluation to improve their performance so that it can become the main choice for the company.

Abstrak: PT Kereta Api Indonesia merupakan Badan Usaha Milik Negara (BUMN) yang bergerak di bidang jasa angkutan penumpang dan barang menggunakan kereta api. Untuk meningkatkan sarana dan prasarana yang ada di PT KAI, salah satu faktor pengadaan barang dan jasa yang dapat menjadi penunjang dan pendukung jalannya operasional kereta api yaitu roda solid kereta. Dalam pelaksanaan pengadaan roda solid kereta PT Kereta Api Indonesia bekerja sama dengan beberapa vendor untuk mencari vendor terbaik dalam pengadaan roda solid kereta. Kelima vendor tersebut yaitu PT. IMST, PT TU, PT BI, PT PEI dan PT IE. Dalam implementasi pengadaan roda solid kereta, ada kalanya vendor tidak bisa menjaga komitmennya sehingga berdampak pada project yang sedang berjalan. Pada penelitian ini penulis menggunakan Metode Profile Matching untuk menentukan vendor mana yang memiliki peringkat yang terbaik. Berdasarkan hasil penelitian terhadap kelima vendor yang mana vendor IMST menempati peringkat pertama dengan nilai hasil akhir 5.71, disusul dengan vendor PEI di peringkat kedua dengan nilai hasil akhir 5.64, kemudian disusul dengan vendor TU di peringkat ketiga dengan nilai hasil akhir 5.58, selanjutnya peringkat ke empat yaitu vendor BI dengan nilai hasil akhir 5.48, dan yang terakhir peringkat kelima yaitu vendor IE dengan nilai hasil akhir 4.92. Hasil pemeringkatan ini dijadikan sebagai masukan bagi perusahaan dalam menentukan mitra utama dan bagi vendor sebagai evaluasi guna meningkatkan kinerjanya sehingga dapat menjadi pilihan utama bagi Perusahaan.



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INTRODUCTION

Developments in industry and technology become a benchmark for success. This has an impact on companies engaged in public services. One of the companies engaged in public services is PT Kereta Api Indonesia or abbreviated as PT KAI. PT Kereta Api Indonesia is a State-Owned Enterprise (BUMN) engaged in passenger and freight transportation services using trains. PT Kereta Api Indonesia has an important role in terms of public services involving several parties. Therefore, the facilities and infrastructure provided by PT KAI must have good standards to support existing service needs (Afifah & Setyantoro, 2021).

In relation to the procurement of solid train wheels, PT KAI collaborates with vendor PT WMI where the vendor provides solid train wheels from January 2023 to June 2023. During the contract or cooperation period between the parties, PT WMI often

To improve the existing facilities and infrastructure at PT KAI, one of the factors in the procurement of goods and services that can support and support the running of train operations is the solid wheels of the train. Solid carriage wheels are wheels mounted on axles or shafts mounted between the wheels with a hydraulically shaped press equipped with roller bearings that function as load support of the weight and cargo it carries. In trains, the wheels rotate in one motion along with their axis to produce forward or reverse motion. In general, solid train wheels are made of carbon steel which has a carbon content of 0.55% - 0.67% (Bakhri et al., n.d.).

experiences delays in sending solid wheel needs requested by PT KAI. The following is table 1 regarding the solid wheel requirements of trains that must be provided by PT WMI during the cooperation period (Maria, 2019).

Table 1 Train Solid Wheel Requirements from PT. WMI to PT. KAI

No.	Month	Number of Solid Wheel Train Requirements	Number of Solid Wheel Train Delays	Percentage (%)
1.	January	1.370	570	41%
2.	February	1.600	580	36%
3.	March	2.280	801	35%
4.	April	1.946	483	24%
5.	Mei	1.125	663	59%
6.	Juni	1.600	580	36%
	Jumlah	9.921	3.677	37%

Source: Document PT. KAI, 2023

From table 1.1, PT. KAI needs 9,921 pieces (pcs) of solid train wheels during January 2023 to June 2023. However, in the process, there was a delay in delivery because the production materials for solid train wheels at PT WMI were limited and experienced obstacles to be processed into solid train wheels. This resulted in a delay in the production of solid train wheels as much as 3,677 pcs or equivalent to 37%, where the figure resulted in disruption of productivity, performance and work targets that had been planned by PT. Previous KAI.

According to Prastiarno (2021: 3), if the percentage exceeds or is above 8%, it becomes a problem in meeting a need. Therefore it can be a problem. The existing problem becomes the author's reference point to conduct a research on an ongoing basis.

Then from the delay in the delivery of the procurement of solid train wheels, PT KAI plans to re-select to select the appropriate vendor in fulfilling solid train wheels that meet PT KAI's standards. From the results obtained by the author, PT KAI has the latest vendor candidates for the fulfillment of solid train wheels. However,

before the selection of new vendors, there are 3 (three) divisions involved in the procurement of solid train wheels, namely the Vice President of Rollingstock Planning (RRP) division which serves as the proposer of solid train wheel procurement, Vice President of Procurement Planning & Evaluation (KLP) as a contract maker, a list of vendors who will work together and evaluate the implementation of train solid wheel procurement, Vice President of Goods & Service (KLU) as price negotiation between vendors and vendor determination.

In the procurement of solid wheel trains, the policy in the company has not been optimal and has not applied any method to determine vendor selection. Therefore, PT KAI is looking for new prospective vendors who produce solid train wheels and has selected vendor candidates including PT IMST, PT TU, PT BI, PT PEI and PT IE. From these prospective vendors, PT KAI will choose 1 (one) vendor to cooperate with PT KAI from July 2023 to December 2023. Therefore, the need for solid train wheels estimated by PT KAI from July 2023 to December 2023 is as follows:

Table 1 PT KAI Train Solid Wheel Requirements for July 2023 – December 2023

No	Month	Number of Needs
1.	July 2023	2.296
2.	August 2023	1.258
3.	September 2023	1.955
4.	October 2023	1.786
5.	November 2023	1.832
6.	December 2023	1.156
	Sum	10.238

Source: Document PT KAI, 2023

From table I. 2, the number of procurements from July 2023 to December 2023 is 10,238 pcs. This number is greater than the previous 6 (six) months. In other words, the selected vendor must have the capacity to produce a solid train wheel product in the appropriate amount every month so that there are no delays and events as before.

From the problems above, the author can identify problems that exist in PT KAI,

namely vendor determination. The author will use the Profile Matching method to solve existing problems so that with the decision support system in the Profile Matching method, this method can overcome problems and be able to select the selection of vendors desired by the company. The *Profile Matching* method will assist in the decision support process to determine which vendors have criteria and meet PT KAI's operational standards. According to (Ongario et al., 2019) explained in his work entitled "Implementation of *Profile Matching* Method to Find Out the Best Supplier at PT. Lautan Luas Medan" published in the journal *Computer Science Information System Prima* (Jusikom Prima) (2019, Vol. 2), that the *Profile Matching* method can be used to select construction service provider vendors at the companies referred to above.

According to (Setiadi et al., 2020) (Bakhri et al., n.d.; Nuraini, 2022; Salkiawati & Lubis, 2019) *Profile Matching* can be at the company. Meanwhile, according to his work entitled "Performance Evaluation Decision Support System" (Salkiawati & Lubis, 2019) *Supplier Using Profile Matching Method*" published in the journal *National Seminar on Information Science & Technology (SENSASI)*, that the Profile Matching method can be used as a solution and reference in determining assessments and can provide correct decisions in determining decisions in collaboration with suppliers. According to explain in his work entitled "Method (Bakhri et al., n.d.) *Profile Matching* in the Gas Unitization Partner Selection Decision Support System" is published in the *Journal of Information & Computer Engineering* (2020, Vol. 5) *that the Profile Matching* method can be used to select gas unitization vendors. According to explaining in his work entitled "Method Implementation (Nuraini, 2022) *Profile Matching* In the Decision Support System for Medical Device Distributor Selection" published in the *informatics development journal* (2022, Vol. 7), that the *Profile Matching* method can be used to select medical device distributor vendors in Medical Device Companies.

METHODS

The method used in this research methodology is Profile Matching. The population obtained by the author in determining the current number of samples was taken from the Vice President of Rollingstock Planning (RRP) division as many as 29 people, Vice President of Procurement Planning & Evaluation (KLP) as many as 18 people, Vice President of Goods & Service Procurement (KLU) as many as 18 people. These divisions are divisions related to the procurement of solid train wheels. The data collection process includes things needed to complete the research such as data collection stages and data collection techniques. In this study, the author conducted interviews with employees of PT Kereta Api Indonesia (Persero) related to problems that occurred, especially in the Unit Subdivision Head of Procurement Planning and Evaluation.

RESULTS AND DISCUSSION

1. Results of Analysis and Discussion

After the data collection and processing stage, the results obtained from the collection and processing of data are used as a basis in the vendor assessment process which has the aim of evaluating the results obtained from data processing. These results are used as decision support in choosing the best vendor to be invited to cooperate (Nofriansyah & Defit, 2017).

a. Competency Gap Mapping Analysis

Every problem that arises, must be resolved by making the right decision. In decision making, decision makers must know what factors will be assessed and are considered to have the most important value and have the best priority among other factors. In competency gap mapping, a problem in a semistructured and unstructured situation can be solved in simple parts for each criterion. Each of the more general criteria can be broken down into several more detailed subcriteria, where they can describe what is intended in the first purpose (Rinaldo & Susanti, 2019).

In the research competency gap mapping conducted by the author, referring to 5 (five) criteria, namely administrative

criteria consisting of subcriteria for entering administrative and technical documents, licenses / certificates of goods. Furthermore, on the price criterion consisting of subcriteria of price appropriateness with the quality of the goods produced, the ability to provide discounts (discounts) on orders in certain quantities. Furthermore, the quality criteria consist of subcriteria for the conformity of goods with predetermined specifications, the provision of goods without defects, the ability to provide consistent quality. Furthermore, the delivery accuracy criteria consist of subcriteria for the ability to deliver goods according to the agreed date. And the last quantity criterion consisting of subcriteria of accuracy and suitability of quantity in shipping, suitability of packaging contents. These criteria have the aim of selecting the best vendor used to cooperate in the procurement of solid wheel trains at PT. KAI in Subdivision Head of Procurement Planning & Evaluation (KLP) unit (Setiadi et al., 2020).

b. Analysis of Criteria Assessment Results

1) Administration Criteria

Based on the results of the processing that has been done, it can be seen in table 2 results of total value processing on administrative criteria, where the administrative criteria are classified into 2 (two), namely the main factor (core factor) consisting of the entry of administrative and technical documents, then for supporting factors (secondary factor) consisting of licenses / certificates of goods.

In table 2 shows the results of groupings and weights that have been calculated and totaled in advance for administrative criteria. In the administrative criteria, it can be seen that the best vendor to cooperate in terms of procurement of solid wheel trains at PT. KAI in the Subdivision Head Procurement Planning & Evaluation unit is shown by vendors who get the highest total value, namely IMST and PEI vendors who get a total value of 6, with the vendor who gets the highest total value, the company can get document administration income in accordance with the wishes and expectations of the company. However, to

get the best vendor, calculations must be made using the five criteria that have been determined.

2) Price Criteria

Based on the results of the processing that has been done, it can be seen in table 4. 28 results of total value processing on price criteria, where the price criteria are classified into 2 (two) factors, namely the main factor (core factor) consisting of price appropriateness with the quality of the goods produced, then the supporting factor (secondary factor) consisting of the ability to provide discounts (discounts) on orders in a certain amount.

It can also be seen which vendor obtained the highest total value. In table 4. 28 shows the results of grouping and weighting that have been calculated and in the previous total on the price criteria can be seen the best vendors who can be invited to cooperate in terms of procurement of solid wheel trains at PT. KAI in the Subdivision Head Procurement Planning & Evaluation (KLP) unit is shown by vendors who get the highest total value, namely TU, BI, PEI vendors by obtaining a total value of 6 with the highest value obtained vendors, the company can obtain material / goods procurement prices that are in accordance with the wishes and expectations of the company.

3) Quality Criteria

Based on the results of the processing that has been done, it can be seen in table 4. 29 results of total value processing on quality criteria, where the quality criteria are classified into 2 (two) factors, namely the main factor (core factor) consisting of goods according to specifications and consistent quality of goods, then the supporting factor (secondary factor) consisting of goods without defects. It can also be seen which vendor obtained the highest total value.

In table 4. 29 indicates the calculated grouping and weighting results and in the previous totals for quality criteria. In the quality criteria, we can see the best vendors who can be invited to work together in terms of procurement of solid train wheels at PT. KAI in the Subdivision Head Procurement Planning & Evaluation (KLP) unit is shown by vendors who get the highest total value, namely TU and BI vendors by obtaining a

total value of 5.5, with the vendor who has the highest value, the company can obtain material / goods procurement prices that are in accordance with the wishes and expectations of the company. However, to get the best vendor, calculations must be made using the five criteria that have been determined.

4) Delivery Accuracy Criteria

Based on the results of the processing that has been done, it can be seen in table 4. 30 results of processing total values on the delivery accuracy criteria, where in the delivery accuracy criteria there are only core factors consisting of delivery capabilities in accordance with the agreed date. It can also be seen which vendor obtained the highest total value.

In table 4. 30 shows the results of grouping and weighting that have been calculated and in the previous total for delivery accuracy criteria. In the criteria for delivery accuracy, it can be seen that the best vendors who can be invited to cooperate in terms of procurement of solid train wheels at PT. KAI in the Subdivision Head Procurement Planning & Evaluation (KLP) unit is shown by vendors who get the highest total value, namely IMST, BI, TU and PEI vendors by obtaining a total value of 6, with the obtaining of vendors who have the highest value, the company can obtain material / goods procurement prices that are in accordance with the wishes and expectations of the company. However, to get the best vendor, calculations must be made using the five criteria that have been determined.

5) Quantity Criteria

Based on the results of the processing that has been done, it can be seen in table 4. 31 results of total value processing on quantity criteria, where the quantity criteria are classified into 2 (two) factors, namely the main factor (core factor) consisting of accuracy and suitability of the amount, then the supporting factor (secondary factor) consisting of the suitability of the contents of the packaging. It can also be seen which vendor obtained the highest total value.

In table 2 indicates the results of groupings and weights that have been calculated and in the previous total for quantity criteria. In the quantity criteria, it

can be seen that the best vendors who can be invited to work together in terms of procurement of solid train wheels at PT. KAI in the Subdivision Head Procurement Planning & Evaluation (KLP) unit is shown by the vendor who gets the highest total value, namely the IMST vendor by obtaining a total value of 6, with the vendor who has the highest value, the company can obtain a material/goods procurement price that is in accordance with the wishes and expectations of the company. However, to get the best vendor, calculations must be

made using the five criteria that have been determined.

2. Analysis of Ranking Results

Based on table 3 to find out the final result of the vendor assessment ranking calculation that will be used by PT. KAI in the *Subdivision Head Procurement Planning & Evaluation* (KLP) unit, which is the result of the total value of each criterion at each vendor.

Table 3 Comparison of values obtained by each vendor

No	Vendor	Na	Nh	Nkual	Nkp	Nkuan	Final Results	Level
1	PT. IMST	5.8	5.5	5.25	6	6	5.71	1
2	PT. PEI	5.4	6	5.5	6	5	5.64	2
3	PT. TU	5.4	6	5.5	6	4.2	5.58	4
4	PT. BI	6	6	4.8	6	5.4	5.42	3
5	PT. IE	4.8	5.6	5.2	4	5	4.92	5

Source: Author Processing Results (2023)

Table 3 shows the final results and ranking determination of the *profile matching* process that has been processed previously. The table shows that IMST vendors get the largest final score among the vendors assessed. So that IMST vendors are entitled to get the first rank or first place by PT. KAI in the *Subdivision Head Procurement Planning & Evaluation* (KLP) unit in supporting vendor selection decisions to cooperate in the procurement of solid train wheels. IMST vendors got a final result score of 5.71 among each vendor assessed and IE vendors got the lowest final score of 4.92.

Based on these results, PT. KAI in the *Subdivision Head Procurement Planning & Evaluation* (KLP) unit in selecting vendors to work with regarding the procurement of solid train wheels must look at the criteria assessed in making decisions. These criteria are assessed from administrative criteria, price, quality, delivery accuracy and quantity. It is intended that the company PT. KAI in the *Subdivision Head of Procurement Planning & Evaluation* unit can obtain administrative and

technical income and licenses / certificates of goods can help companies in the initial process of vendor registration able to select the best vendors, then in the price criteria, the company also gets the appropriate price so that it does not come out of the draft cost budget that has been made and the company can still get *profit* desirable. Then in the quality criteria can get the best quality in the *project* being worked on. Furthermore, on the criteria for delivery accuracy, because delivery accuracy is a very important aspect in the implementation of the *project*, the company must get the accuracy of delivery of goods in accordance with what has been agreed. Then finally the company's quantity criteria must get the accuracy and suitability of the goods in accordance with what has been agreed between the parties .

Vendor assessment at PT. KAI in the *Subdivision Head Procurement Planning & Evaluation* (KLP) unit in terms of procurement of solid train wheels is very useful to find out which vendor has the best performance in doing the part of the task that must be done by

the vendor, but if the performance assessment in terms of procurement of solid wheels of trains at PT. KAI in the *Subdivision Head Procurement Planning & Evaluation (KLP)* unit is not carried out, it will cause new problems that will arise (Sianipar, 2020).

CONCLUSION

Based on the results of data processing and analysis as well as discussions that have been carried out in the previous chapter that have been carried out at PT. KAI in the Subdivision Head of Procurement Planning & Evaluation unit regarding the assessment of vendors who will be invited to work together, conclusions can be drawn based on the problems previously formulated as follows. Gems, the application of the implementation of the procurement of solid train wheels in vendor selection using the profile matching method, namely:

- Step 1, define in advance the criteria that will be used as a benchmark for solving problems.
- Step 2, calculate the value of the gap between the subject profile and the required profiles.
- Step 3, calculate the value of the mapping gap sourced from the gap analysis.
- Step 4, Calculate the Final Value.
- Step 5, Perform a whining.

After doing calculations using the vendor profile matching method selected by PT Kereta Api Indonesia, namely PT. IMST because it ranked first with a total value of 5.71.

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