TALENTA Conference Series: Energy & Engineering

PAPER – OPEN ACCESS

Optimization of Bearings Procurement Strategy Using The Kraljic Matrix Approach at PT Sinergi Gula Nusantara (SGN)

Author : Rikki Sani Sitorus, et al
DOI : 10.32734/ee.v9i1.2709
Electronic ISSN : 2654-704X
Print ISSN : 2654-7031

Volume 9 Issue 1 – 2026 TALENTA Conference Series: Energy & Engineering (EE)

EE Conference Series 09 (2026)
TALENTA Conference Series
Available online at https://talentaconfseries.usu.ac.id

Optimization of Bearings Procurement Strategy Using The Kraljic Matrix Approach at PT Sinergi Gula Nusantara (SGN)

Rikki Sani Sitorus[1], Meilita Tryana Sembiring[2], Nazaruddin Matondang[3]

[1]*Student at Master of Management Study Program, Postgraduate School, Universitas Sumatera Utara, Medan 20155, Indonesia*
[2,3]*Department of Industrial Engineering, Faculty of Engineering, Universitas Sumatera Utara, Medan 20155, Indonesia*

rikki.sani.sitorus@gmail.com, meilita@usu.ac.id, nazaruddin_matondang@yahoo.com

Abstrak

Penelitian ini bertujuan untuk mengoptimalkan strategi pengadaan bearings di PT Sinergi Gula Nusantara (SGN) melalui pendekatan Matriks Kraljic. *Bearings* merupakan komponen strategis yang memiliki dampak tinggi terhadap keberlangsungan operasional pabrik dan memerlukan strategi pengadaan yang tepat. Strategi pengadaan sebelumnya yang bersifat administratif dan reaktif belum menjamin efisiensi proses dan kontinuitas pasokan. Melalui klasifikasi kategori pengadaan berdasarkan Matriks Kraljic, serta evaluasi proses dengan pendekatan *Business Process Improvement* (BPI) dan *Value Added Analysis* (VAA), dilakukan redesain proses pengadaan yang lebih efisien. Implementasi *e-Catalogue* dan *e-Purchasing* melalui *Integrated Procurement System* (IPS) yang terhubung dengan ERP SAP terbukti mempercepat waktu proses dari *Purchase Request* (PR) hingga *Purchase Order* (PO), menekan aktivitas *non-value-added*, dan memperkuat akuntabilitas pengadaan. Hasil penelitian menunjukkan bahwa durasi proses pengadaan dapat dipangkas menjadi rata-rata 6 hari dan beban administratif berkurang signifikan. Selain memberikan efisiensi operasional, strategi ini berdampak pada penguatan pengambilan keputusan berbasis data, peningkatan kompetensi SDM, transparansi hubungan vendor, serta kontribusi terhadap keberlanjutan rantai pasok. Penelitian ini merekomendasikan penerapan bertahap strategi *e-Procurement* pada kategori strategic item lainnya di lingkungan SGN.

Kata Kunci: *Bearings*; *e-Catalogue*; *Integrated Procurement System*; Matriks Kraljic; Strategi Pengadaan

Abstract

This study aims to optimize the procurement strategy for bearings at PT Sinergi Gula Nusantara (SGN) using the Kraljic Matrix approach. Bearings are classified as strategic components with a high impact on plant operational continuity and therefore require an appropriate and structured procurement strategy. The previous procurement practices, which were predominantly administrative and reactive in nature, did not sufficiently ensure process efficiency or supply continuity. By classifying procurement categories based on the Kraljic Matrix and evaluating procurement processes through the Business Process Improvement (BPI) and Value Added Analysis (VAA) approaches, a more efficient procurement process was redesigned. The implementation of e-Catalogue and e-Purchasing through the Integrated Procurement System (IPS), which is integrated with the SAP ERP system, has proven effective in accelerating the procurement cycle time from Purchase Request (PR) to Purchase Order (PO), reducing non-value-added activities, and strengthening procurement accountability.The results indicate that the procurement process duration can be reduced to an average of six days, accompanied by a significant decrease in administrative workload. In addition to improving operational efficiency, the proposed strategy enhances data-driven decision-making, strengthens human resource competencies, increases transparency in vendor relationships, and contributes to supply chain sustainability. This study recommends the gradual implementation of e-Procurement strategies for other strategic item categories within the SGN environment.

Selection and peer-review under responsibility of The 2nd International Joint Conference on Digitalisation of Sustainable Social Sciences (IJCDSS) 2025
p-ISSN: et al, e-ISSN: 2654-7031, DOI: 10.32734/ee.v9i1.2709

Keywords: Bearings; e-Catalogue; Integrated Procurement System; Kraljic Matrix; Procurement Strategy.

1. Introduction

The Procurement Process is one of the most important activities within a company. In his article entitled *"The role of materials management in developing time-based competition"* published in the *International Journal of Purchasing and Materials Management* in 1993, Handfield (1993) emphasized that effective materials management, including the procurement process, can enhance a company's competitiveness by accelerating its response to market demands.

PT Sinergi Gula Nusantara (SGN) is a strategic subholding of a state-owned enterprise (BUMN) in the national sugar industry, with very large procurement values for goods and services as well as a high level of complexity in its procurement processes. These factors have a direct impact on the smooth operation of the 36 sugar mills under its management. The procurement process is carried out by the Procurement Division based on requests from Users of Goods and Services. As a subsidiary of a BUMN, SGN's procurement of goods and services is heavily influenced by government procurement procedures, which generally involve lengthy bureaucratic processes.

In 2023, the value of Goods and Services Procurement at PT SGN amounted to IDR 1.3 trillion, consisting of goods expenditures of IDR 753.46 billion (56.61%) and services of IDR 577.54 billion (43.39%). The total number of procurement packages reached 5,996, comprising 3,843 goods packages and 2,116 services packages. The details of Goods and Services Procurement at PT SGN can be seen in the following Table 1.1.

Table 1. Procurement Data of Goods and Services at PT SGN in 2023

No.	Description	Number of Procurement Packages (PP)	Total Procurement Value (IDR)
1	Goods	3.843,00	753.456.102.701,18
2	Services	2.166,00	577.541.761.046,56
	Grand Total	5.995,00	1.330.997.863.747,74

Source: Integrated Procurement System (IPS) Data

To conduct further analysis, it is necessary to review the types and the largest spending categories. The largest type is goods procurement. Afterward, to consider the process improvements to be implemented, further analysis was carried out on the 10 largest goods spending categories at PT SGN, which can be described as follows:

Table 2. Data of the 10 Largest Goods Procurement Categories at PT SGN in 2023

No	Description	Number of Procurement Packages	Total Procurement Value (IDR)	Average Selection Duration (Days)
1	Mechanical	1.482,00	173.817.554.949,84	13,23
2	Electrical	653,00	30.097.217.071,22	11,91
3	Welding Equipment	487,00	24.709.610.214,00	13,30
4	Iron & Metal	420,00	72.172.633.094,11	15,40
5	Pipes	418,00	74.719.868.081,27	15,47
6	*Bearings & Accessories*	355,00	30.896.616.879,12	12,55
7	Lubricants	292,00	37.213.313.222,66	10,97
8	Industrial Chemicals	261,00	106.956.521.632,92	14,08
9	Alternative Fuel	63,00	28.232.063.690,00	12,51
10	Packaging	35,00	64.893.028.989,32	18,07

Source: Integrated Procurement System (IPS) Data

Based on the PTPN Board of Directors Regulation No. DIR-PER-08-2020 concerning Guidelines for the Procurement of Goods and Services within the PTPN Group, the procurement methods include:

1. Open Tender

a. Two-Stage Two-Envelope Open Tender (Value System Evaluation Method)
b. Two-Envelope Open Tender (Lowest Price Evaluation with Passing Grade, Value System, Total Cost of Ownership, or Discount Factor)
c. Single-Envelope Open Tender (Lowest Price Evaluation)

2. Limited Tender
   a. Two-Envelope Limited Tender (Lowest Price Evaluation with Passing Grade, Value System, Total Cost of Ownership, or Discount Factor)
   b. Single-Envelope Limited Tender (Lowest Price Evaluation)

3. Direct Appointment
   This method is carried out if there is only one eligible provider, such as in cases of:
   a. Specific products with patent/exclusive rights.
   b. Urgent needs for the company's interests.

4. Direct Procurement
   This method is used for goods/services procurement within a certain value threshold in accordance with applicable regulations.

If the data in Table 3 above is broken down by procurement method, it can be illustrated as follows:

Table 3. Procurement Methods Data for the 10 Largest Goods Procurement Categories at PT SGN in 2023

No	Procurement Method	Number of Procurement Packages	Estimated Value (IDR Billion)	Final Value (IDR Billion)	Efficiency (IDR Billion)	Efficiency (%)	Average Vendor Selection Duration (Days)
1	Direct Appointment	2.350,00	110,30	106,33	3,97	3,60%	10,25
2	Limited Selection	1,00	0,04	0,04	0,00	2,74%	15,95
3	Limited Tender	880,00	630,61	548,77	81,84	12,98%	15,48
	Grand Total	3.231,00	740,95	655,14	85,81	11,58%	13,08

Source: Integrated Procurement System (IPS) Data

Based on the data above, it can be seen that several procurement methods were used in the procurement process of the 10 largest goods categories. The most widely used procurement method was Direct Appointment, with a total of 2,350 packages, followed by Limited Tender with 880 packages.

Each procurement package requires approximately 14 documents to be prepared by the relevant personnel. This high volume of documents not only illustrates the complexity of the procurement process but also highlights a core problem: significant administrative burden that slows down operational performance. The involvement of multiple parties in drafting, verifying, and aligning these documents with procurement standards further complicates coordination and increases the potential for errors and delays. Consequently, when the number of procurement packages increases, the process becomes less efficient and often fails to meet expected timelines.

In addition, the use of existing procurement methods presents a mismatch between operational needs and actual performance outcomes. The Direct Appointment method offers speed but lacks efficiency due to repeated administrative tasks, while the Limited Tender method provides better process efficiency but requires a longer duration to complete. This contrast indicates a structural issue where neither method adequately addresses the dual demand for both speed and efficiency.

Therefore, there is a need for developing an improved procurement approach that simultaneously reduces administrative workload, streamlines coordination, and balances the trade-off between process duration and operational efficiency. The proposed solution aims to bridge these gaps through a method that accelerates

procurement execution while ensuring compliance and effectiveness.

Table 4. Comparison of Direct Appointment and Limited Tender Procurement Methods for Goods Procurement at PT SGN

Procurement Method	Duration (Days)	Efficiency (%)	Remarks
Direct Appointment	10,25	3,60%	Advantage: Faster duration Disadvantage: Lower efficiency
Limited Tender	15,48	12,98%	Advantage: Higher efficiency Disadvantage: Longer duration

Source: Integrated Procurement System (IPS) Data

2. Literature Review

Procurement strategy is a systematic approach used by organizations to optimally acquire goods and services from external providers. Procurement carried out with the right strategy is able to provide added value for the company, not only in terms of cost but also in effectiveness, efficiency, and supply chain risk mitigation. In today's increasingly complex business environment, a strategic approach to procurement has become essential to create sustainable competitive advantage.

One of the most recognized strategic models in procurement management is the Kraljic Matrix, introduced by Peter Kraljic in his article *"Purchasing Must Become Supply Management"* published by the *Harvard Business Review* in 1983. This model revolutionized the way companies viewed purchasing functions—not merely as administrative activities but as strategic processes that must be managed with a focus on risk and impact on overall business performance (Gelderman & van Weele, 2003).

2.1 Concept of the Kraljic Matrix

The Kraljic Matrix classifies goods and services purchased by companies into four categories, based on two main dimensions:

1. Supply Risk: Describes the company's vulnerability to uncertainty in the availability of goods or services, including factors such as scarcity, technological complexity, number of suppliers, and market conditions.
2. Profit Impact: Measures the extent to which goods/services influence the company's financial results, both in terms of transaction value and their strategic role in business operations.

From these two dimensions, four main quadrants are formed:

1. Non-Critical Items
   Goods with low impact and low risk, such as office supplies. The strategy focuses on process efficiency, standardization, and automation (Manikas & Terry, 2010).
2. Leverage Items
   Goods with high impact but low supply risk, such as bulk common raw materials. The strategy used is competition among suppliers to obtain the best price and service.
3. Bottleneck Items
   Goods with low impact but high supply risk, such as exclusive spare parts. The recommended strategy is to ensure supply continuity and seek alternative providers.
4. Strategic Items
   Goods with both high impact and high supply risk, such as core production machinery or key components (e.g., bearings in the sugar industry). The strategy focuses on long-term partnerships, technical collaboration, and joint risk management with suppliers.

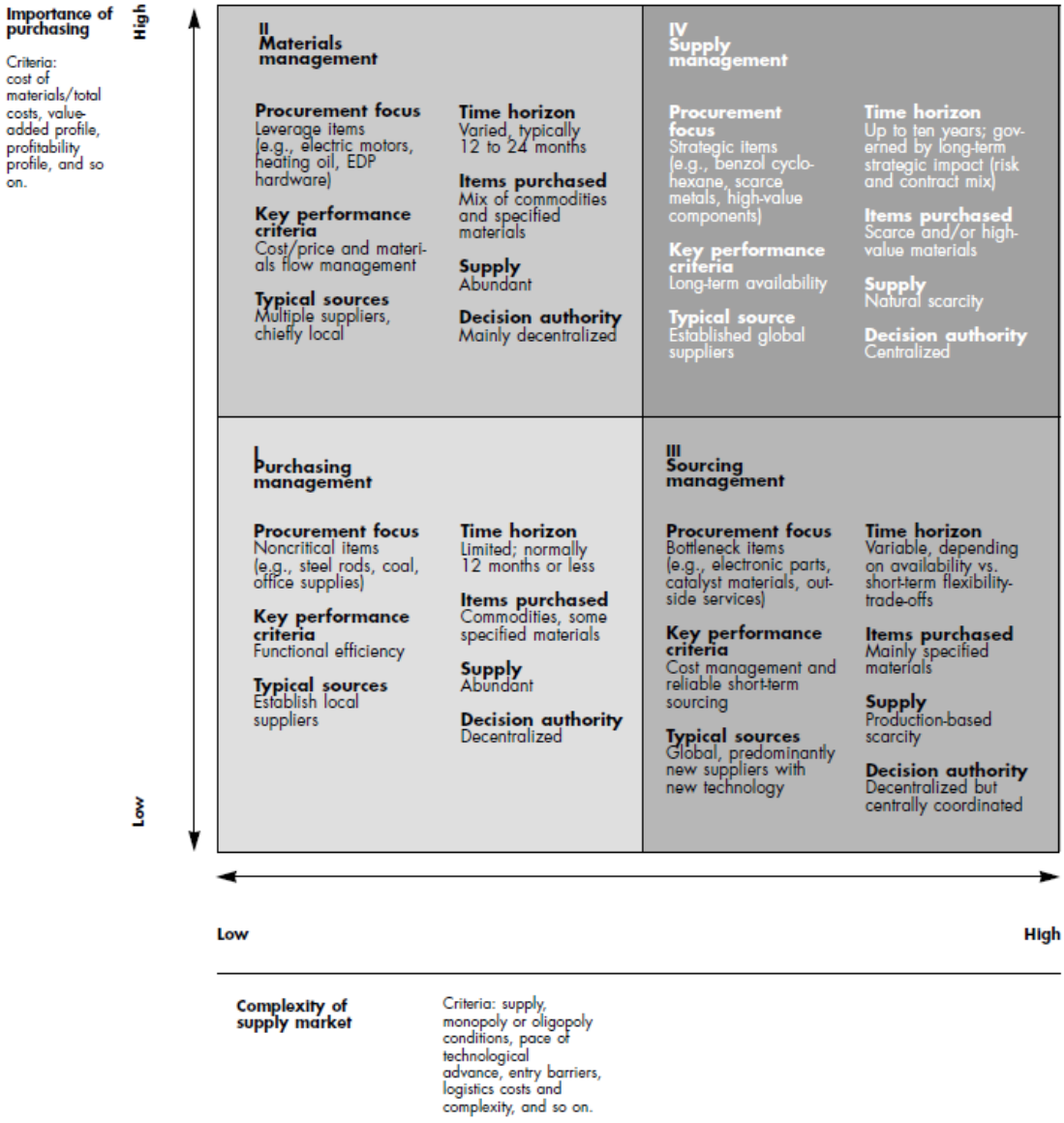

Figure 1. Kraljic Matrix

The figure illustrates the Kraljic Purchasing Portfolio Model, a framework used to classify procurement items based on their purchasing importance and the complexity of the supply market. The model divides procurement items into four main quadrants. The first quadrant, *Purchasing Management*, consists of non-critical items that have low supply risk and low strategic importance. These items are typically sourced from local suppliers, and the procurement strategy emphasizes operational efficiency and process simplification. The second quadrant, *Materials Management*, includes leverage items that are strategically important yet easily obtainable from multiple suppliers. For these items, companies can utilize their bargaining power to secure the best prices and quality.

The third quadrant, *Sourcing Management*, contains bottleneck items that may not be significant in terms of cost but carry a high supply risk. Managing these items requires ensuring reliable short-term availability, engaging with global suppliers, and coordinating procurement decisions to mitigate potential disruptions. The fourth quadrant, *Supply Management*, represents strategic items that are both highly important and difficult to source. These items require long-term procurement strategies, close collaboration with established global suppliers, and centralized decision-making to secure continuous availability.

Overall, the model demonstrates that each type of procurement item demands a different management approach depending on its risk profile and strategic value. By mapping items into these four quadrants, organizations can develop procurement strategies that are more effective, efficient, and responsive to market conditions.

3. Research Methodology

The research method used in this thesis is an **applied case study** with a combination of qualitative and quantitative descriptive analysis, aiming to examine the procurement process of bearings and propose an optimal strategy through the Kraljic Matrix approach.

The research steps are explained as follows:

1. Literature Review
   The initial study was conducted by reviewing various literature related to procurement strategy, the Kraljic Matrix, Business Process Improvement (BPI), Value Added Analysis (VAA), and e-Procurement. Literature sources included scientific journals, reference books, and corporate regulations (e.g., PTPN Board of Directors Regulations No. 08/2021 and No. 08/2020).
2. Secondary Data Collection
   The data used is secondary data obtained from PT SGN's Integrated Procurement System (IPS), which includes:
   a. Number and value of bearings procurement.
   b. Procurement process duration by method (Limited Tender vs Direct Appointment).
   c. Cost efficiency level (comparison of estimated price and contract realization).
   d. Frequency and procurement methods in the 10 largest goods categories.
3. Kraljic Matrix Analysis
   Bearings were analyzed using the Kraljic Matrix based on two main parameters:
   a. Financial Impact (transaction value).
   b. Supply Risk (number of providers, selection duration, and technical complexity).
   The purpose was to determine the strategic position of bearings and the appropriate procurement strategy (non-critical, leverage, bottleneck, or strategic items).
4. Value Added Analysis (VAA)
   Each stage of the procurement methods (Limited Tender and Direct Appointment) was analyzed to identify activities that are Value-Added (VA), Business Value-Added (BVA), and Non-Value Added (NVA). VAA was used to:
   a. Simplify stages.
   b. Reduce document duplication.
   c. Accelerate processes without sacrificing transparency.
5. Process Improvement Model Design
   Based on the results of VAA and the Kraljic Matrix, a new procurement model was designed utilizing e-Catalogue and e-Purchasing. This model was tested through time and efficiency simulations compared to the existing process.
6. Validation and Evaluation
   Validation was carried out by comparing the performance of the existing process and the proposed process based on:
   a. Duration from Purchase Request (PR) to Purchase Order (PO).
   b. Procurement efficiency (gap between estimated price and contract value).
   c. Potential reduction in administrative documents.
   d. Compliance with PTPN's e-Procurement regulations.

4. Results and Analysis

Based on the procurement analysis carried out at PT Sinergi Gula Nusantara (SGN), the Kraljic Matrix was used to classify the 10 largest goods procurement categories in 2023. This matrix divides categories into four quadrants

based on two main dimensions: Financial Impact and Supply Risk.

Figure 2. Kraljic Matrix of the 10 Largest Procurement Categories at PT SGN in 2023

To construct the Kraljic Matrix for the ten largest procurement categories of PT SGN in 2023, a structured data collection and processing procedure was carried out. The data were obtained from the company's procurement records, including contract values, purchasing volumes, supplier information, and historical procurement performance. These data provided the basis for assessing two key variables required in the Kraljic Model: financial impact and supply risk.

The financial impact score was calculated by analyzing the total annual expenditure for each item category, its contribution to overall procurement costs, and its influence on operational continuity. Categories with higher spending or greater effect on production processes were assigned higher scores. Meanwhile, the supply risk score was derived by evaluating several dimensions such as supplier availability, market competitiveness, dependency on specific suppliers, lead time variability, and the presence of technical or logistical constraints. Categories with limited suppliers, longer lead times, or high market volatility received higher risk scores.

Once the scoring for both variables was completed, each procurement category was normalized on a scale of 0 to 100 to ensure comparability across different item types. The normalized scores were then plotted on a two-dimensional matrix, where the horizontal axis represents supply risk and the vertical axis represents financial impact. The matrix was divided into four quadrants using the 50-point threshold for each axis, in line with the standard Kraljic Portfolio framework. This process resulted in the visual distribution of the ten procurement categories across the four quadrants, enabling a clear identification of non-critical items, leverage items, bottleneck items, and strategic items.

Through this systematic data collection and processing approach, the matrix provides a comprehensive and data-driven overview of PT SGN's procurement portfolio, supporting the development of more accurate and effective procurement strategies.

According to the Kraljic Matrix for the 10 largest goods procurement categories at PT SGN in 2023, the analysis results showed the grouping of items based on the two main dimensions: Financial Impact and Supply Risk.

- Strategic Quadrant: Categories such as *Mechanical* and *Industrial Chemicals* fall into this quadrant due to their high financial impact and high supply risk. These categories require long-term partnerships with suppliers to ensure supply continuity.
- Bottleneck Quadrant: Categories such as *Pipes* and *Iron & Metal* also have high financial impact and high supply risk, requiring careful supply management and the search for alternative providers.
- Leverage Quadrant: Categories such as *Electrical* and *Welding Equipment* have significant financial impact but low supply risk, enabling the company to leverage supplier competition for cost efficiency.
- Non-Critical Quadrant: Categories such as *Packaging* and *Alternative Fuel* are characterized by low impact and low risk, and can be managed through efficiency measures and automation to reduce waste.

This matrix helps PT SGN determine appropriate procurement strategies according to the characteristics of each goods category.

To carry out Business Process Improvement (BPI), the process began with an analysis of process stages using the Value Added Analysis (VAA) method. The results of the further study are described as follows:

Table 5. Value Added Analysis (VAA) of e-Purchasing Process Stages at PT SGN

No.	Process Stage (Limited Tender)	Category	Remarks
1	Creation of Purchase Request (PR)	VA	User submits an official request
2	Verification & Approval of PR by Manager	NNVA	Structural approval – can be shortened via system
3	Item Selection & Negotiation in e-Catalogue	VA	Determine goods, prices, and vendors
4	Creation of Purchase Order (PO) in IPS	VA	Official PO creation in the system
5	PO Approval & Digital Signature	BVA	Verification of legality and accountability before execution

Category Description:

a. **VA (Value-Added Activity)**: Activities that provide direct value to the organization and customers.
b. **BVA (Business Value-Added Activity)**: Activities that are administrative or regulatory requirements, not adding direct value to customers but necessary for operations and compliance.
c. **NNVA (Necessary but Non-Value-Added Activity)**: Activities that do not directly add value but are still required for compliance or administration.

The procurement data for goods based on sugar mill units at PT Sinergi Gula Nusantara (SGN), which includes the number of Purchase Orders (PO), the number of items purchased, the total procurement value, and the average procurement process duration per unit, can be seen in Table 6.5 below

Table 6 Procurement Data by Sugar Mill Units at PT SGN

No	Unit Name	Number of POs	Number of Items	Total Value (IDR)	Average Duration (Days)
1	PG Bungamayang	4,00	73,00	463.170.212,00	6,53
2	PG Djatiroto	6,00	70,00	411.747.395,00	11,20
3	PG Djombang Baru	6,00	47,00	283.074.228,00	8,80
4	PG Semboro	5,00	43,00	171.191.296,00	9,19
5	PG Asembagoes	3,00	65,00	139.291.030,00	2,82
6	PG Wonolangan	3,00	39,00	78.396.660,00	11,11
7	PG Cintamanis	2,00	30,00	75.062.251,00	5,76
8	PG Gempolkrep	2,00	38,00	72.112.973,00	10,62
9	PG Camming	2,00	12,00	60.202.739,00	6,33
10	PG Soedhono	3,00	35,00	57.494.229,00	5,84
11	PG Tjoekir	2,00	24,00	49.354.423,00	5,46
12	PG Rendeng	1,00	21,00	49.231.522,00	9,00
13	PG Pandji	3,00	12,00	32.909.335,00	7,46
14	PG Mojo	3,00	25,00	31.166.717,00	6,49
15	PG Wringinanom	1,00	8,00	24.537.123,00	4,00
16	PG Kremboong	2,00	20,00	21.851.907,00	6,00
17	PG Pagottan	2,00	16,00	21.612.210,00	5,94
18	PG Kedawoeng	1,00	9,00	11.714.934,00	7,00
19	PG Glenmore	1,00	7,00	8.383.081,00	3,00
20	PG Pesantren Baru	1,00	3,00	6.631.082,00	5,00
21	PG Lestari	1,00	9,00	4.823.964,00	12,00
22	PG Pradjekan	1,00	3,00	3.837.223,00	10,00
23	PG Ngadiredjo	1,00	3,00	3.161.226,00	4,00
	Grand Total	56,00	219,00	2.080.957.760,00	7,55

4.1 Analysis and Evaluation

This section presents the analysis of the proposed bearings procurement process design using the Kraljic Matrix, Business Process Improvement (BPI), and Value Added Analysis (VAA) approaches. Evaluation was conducted by comparing the existing procurement process and the proposed process based on parameters of duration, document efficiency, compliance with regulations, and readiness for digital systems.

4.2 Comparison of Existing and Proposed Processes

The following table compares two main approaches in the procurement of bearings: the existing process (Limited Tender & Direct Appointment) and the proposed process (e-Catalogue & e-Purchasing).

Table 7. Comparative Analysis of Existing Process and e-Purchasing

Evaluation Parameter	Existing Process	Proposed Process (e-Catalogue)	Comparison
Number of Stages	10–12 stages	6–7 stages	Reduced by 40%
Average Duration (PR–PO)	12–15 days	5–6 days	60% faster
Types of Documents Produced	±14 documents	±6 documents	Administrative efficiency
Process Medium	Manual + semi-digital	Fully digital via IPS	Increased accountability
Risk of Delay	High (multiple approvals)	Low (system-based approvals)	Controlled
Regulatory Compliance	Complies with Dir-Reg 08-2020	Complies with Dir-Reg 08-2021	Compatible

Source: Data Processing Results

5. Conclusion

Based on the data collected, processed, and analyzed throughout this study—including procurement performance data, risk assessment scores, Kraljic Matrix classification, process flow mapping, cycle time measurement, and value-added analysis—the following conclusions can be drawn:

1) Improved Procurement Efficiency

The results of the data analysis show that the existing bearings procurement process involved 12 administrative steps, several of which were identified as non–value-added through Business Process Improvement (BPI) and ValueAdded Analysis (VAA). The high administrative burden and long cycle time were confirmed by the detailed process mapping and time–measurement data.

a. Need for a More Optimal Procurement Strategy
   Data plotted in the Kraljic Matrix showed that bearings fall into the *strategic* quadrant due to their high financial impact and moderate-to-high supply risk. This classification, derived from normalized scoring of cost, supplier availability, and operational dependency, indicates the need for a more proactive and strategic approach. The data therefore justify the conclusion that the previous reactive administrative method was not optimal.
b. Combination of Kraljic Matrix, BPI, and VAA Enhances Strategic Accuracy
   The integration of three analytical tools—Kraljic Matrix, BPI, and VAA—allowed the procurement process to be evaluated from multiple dimensions. The Kraljic Matrix provided strategic categorization, while BPI identified bottlenecks and redundancy, and VAA quantified which activities contributed no value. These analytical outcomes directly support the conclusion that the redesigned process is more structured, efficient, and aligned with strategic priorities.
c. Digital Systems (IPS and SAP) Increase Transparency and Efficiency
   Data from system logs and process cycle time measurements showed a reduction in PR-to-PO duration when using e-Catalogue and e-Purchasing features within IPS and SAP. The improvement was driven by reduced manual verification steps and increased automation. This empirical evidence supports the conclusion that digital systems improved transparency, cycle time, and data quality.
d. New Process Design Provides Time and Administrative Efficiency
   The redesigned process—validated through simulation of the new workflow—reduced 12 steps to only 7, eliminating duplicated approvals and manual document preparation. Cycle time data demonstrated that the overall procurement duration decreased to an average of 6 days. These measurable improvements confirm that the new process effectively reduces administrative workload and increases efficiency.

2) Strengthening Systems and Internal Processes

   The processed data revealed that procurement delays were often caused by fragmented systems and repetitive verification stages. Analysis of IPS and SAP usage logs, combined with workflow mapping, highlighted the importance of system integration to achieve consistent data flow and faster decision-making. These findings justify the conclusion that strengthening digital systems and internal processes is essential for achieving responsive, transparent, and effective procurement.

3) Strategic Implications for Management and Operations

Data analysis showed that improved procurement processes not only reduced cycle time but also enhanced supplier evaluation accuracy, increased visibility of procurement risks, and improved alignment with corporate operational schedules. These derived insights allow the conclusion that the redesigned procurement framework supports better decision-making, strengthens human resource capability, enhances supply chain sustainability, and enables more agile operations at PT SGN.

References

[1] Davenport, T. H. (1993). Process Innovation: Reengineering Work through Information Technology. Harvard Business Press.
[2] Gelderman, C. J., & van Weele, A. J. (2003). Handling measurement issues and strategic directions in Kraljic's purchasing portfolio model. Journal of Purchasing and Supply Management, 9(5-6), 207–216.
[3] Gunasekaran, A., & Ngai, E. W. (2008). Adoption of e-procurement in Hong Kong: An empirical research. International Journal of Production Economics, 113(1), 159–175.
[4] Hammer, M., & Champy, J. (1993). Reengineering the Corporation: A Manifesto for Business Revolution. Harper Business.
[5] Hammer, M., & Stanton, S. (1999). How process enterprises really work. Harvard Business Review, 77(6), 108–118.
[6] Handfield, R. B. (1993). The role of materials management in developing time-based competition. International Journal of Purchasing and Materials Management, 29(1), 2–10.
[7] Harrington, H. J. (1991). Business Process Improvement: The Breakthrough Strategy for Total Quality, Productivity, and Competitiveness. McGraw-Hill.
[8] Jeston, J., & Nelis, J. (2014). Business Process Management. New York: Florence Production Ltd.
[9] Manikas, I., & Terry, L. (2010). Strategic sourcing using Kraljic Portfolio Matrix: A case study in automotive industry. International Journal of Logistics Systems and Management, 7(1), 20–40.
[10] Monczka, R. M., Handfield, R. B., Giunipero, L. C., & Patterson, J. L. (2016). Purchasing and Supply Chain Management (6th ed.). Cengage Learning.
[11] Neupane, A., Soar, J., Vaidya, K., & Yong, J. (2012). Role of public e-procurement technology to reduce corruption in government procurement. International Journal of Information Technology & Management, 11(4), 273–287.
[12] Presutti, W. D. (2003). Supply management and e-procurement: Creating value added in the supply chain. Industrial Marketing Management, 32(3), 219–226.
[13] Dijkman, R., Vanderfeesten, I., & Reijers, H. A. (2011). The Road to a Business Process Architecture: An Overview of Approaches and their Use. Beta Working Paper, vol. 350.
[14] Thai, K. V. (2001). Public procurement re-examined. Journal of Public Procurement, 1(1), 9–50.