Optimizing the Procurement Process through KPI Implementation in a Power BI Dashboard for a Neuquén-Based SME

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Abstract

In an increasingly competitive context, SMEs in the oil & gas sector require analytical tools that integrate data and inform decisions; this study aimed to design and implement a KPI dashboard in Power BI to manage the procurement process of a Neuquén-based SME. A quantitative approach with qualitative support was applied: integration of 100% of historical data from the Finnegans GO ERP, stage-by-stage time modeling, interactive visualizations, and triangulation with interviews and a survey of internal clients. Based on 556 records, the average cycle time was 24.21 days and the main bottleneck was located between the signing of the Purchase Order (Nota de Pedido, NP) and the linking of the invoice (13.62 days), in a scenario of low request anticipation (53% with 0–3 days). We conclude that the dashboard provides actionable information to standardize approvals and reminders, establish minimum anticipation policies, manage suppliers by performance, and implement alerts and SLAs. Limitations include the single-case design and potential heterogeneity in ERP data-entry quality. Future lines include pre–post intervention evaluation, predictive analytics, and process mining.
Keywords: KPI; Power BI; oil & gas procurement.

1. Introduction

Efficient purchasing management and digital transformation have gained increasing relevance in recent years, as they directly impact firms' competitiveness and sustainability. The literature highlights that Key Performance Indicators (KPIs) are strategic tools that align operational management with long-term objectives, improving planning and control in complex sectors such as oil & gas (Elena Marsovna Deberdieva, 2015). Likewise, implementing business intelligence technologies has been identified as a decisive factor to optimize decision-making through the analysis of large volumes of data and the dynamic visualization of information (Akshay Uttam Shende & Shende, A., 2025; Ruel, 2022).

Despite these advances, many organizations—especially SMEs—still face major constraints linked to the absence of integrated control panels to monitor indicators in real time. Several studies show that the lack of systematic KPI measurement creates bottlenecks in purchasing management and hampers operational efficiency (Akshay Uttam Shende & Shende, A., 2025; Ruel, 2022). In the specific case of the oil & gas sector in the city of Neuquén, the digitalization and use of technologies such as Power BI have not yet been fully implemented in supply processes, which represents a practical and academic gap.

Within this framework, the purpose of the present work is to design and implement a KPI control dashboard in Power BI for the purchasing process of a Neuquén SME in the oil & gas sector, in order to integrate 100% of available historical data and generate reliable indicators for strategic decision-making. The specific objective focuses on measuring average lead times at each stage of the process (from request to payment), enabling the detection of delays, optimization of planning, and establishment of preventive alerts that strengthen management. Thus, the research is not only grounded in prior studies on digitalization, innovation, and organizational efficiency (Tatyana Ostryanina, 2022; Francisco Núnes, 2024), but also seeks to contribute a case applied to the regional reality, informing the debate on how SMEs can

incorporate digital transformation tools and decision-support systems to improve their organizational performance.

2. Methodology

Data collection.

Data collection was carried out using historical records stored in the Finnegans GO ERP from the purchasing area of the Neuquén SME in the oil & gas sector. The full set of purchase orders was used—documents that support each transaction performed by the Supply area—allowing the complete cycle to be traced from the request until invoices are ready for payment. An Excel report extracted from the ERP concentrated key information on lead times for each stage of the process. This documentary review was complemented with semi-structured interviews with Supply staff and with a satisfaction survey of internal clients, in order to identify actual execution times, perceptions of efficiency, and possible delays not reflected in formal documentation.

Approach implemented.

The research used a quantitative approach with qualitative support. The quantitative component focused on measuring average lead times and building key indicators (KPIs) linked to the efficiency of the supply process. The qualitative component enriched the interpretation of results with information obtained from interviews and the internal-client survey, providing context to the numbers and explaining the causes behind identified delays.

Data analysis.

The analysis was developed from information obtained from the Finnegans GO ERP, exported to Excel and integrated into Power BI. Using this tool, a dynamic control dashboard was designed to calculate average lead times for each stage: from order entry to need date, linkage to the Purchase Order (NP), its approval, receipt and posting, and the total time of the entire cycle. Comparative charts, slicers, and interactive visualizations facilitated the identification of bottlenecks and generated decision-relevant information, while providing the organization with a flexible, multi-purpose tool.

Research participants

The research involved:

- Head of the purchasing area, responsible for providing documentary information and explaining the administrative flow.
- Purchasing assistants, who contributed additional data on day-to-day operations.
- Internal clients, selected by the head of purchasing, who provided their view on service quality and timeliness.
- Research team, made up of course students, responsible for systematization, data analysis, and dashboard design in Power BI.

Participant characteristics.

Internal participants were characterized by practical experience in the oil & gas sector and knowledge of supply processes, though with certain limitations in the use of advanced digital tools. In general, participants were over 21 years old, of all genders, with completed secondary and university studies, working in different sectors of the organization.

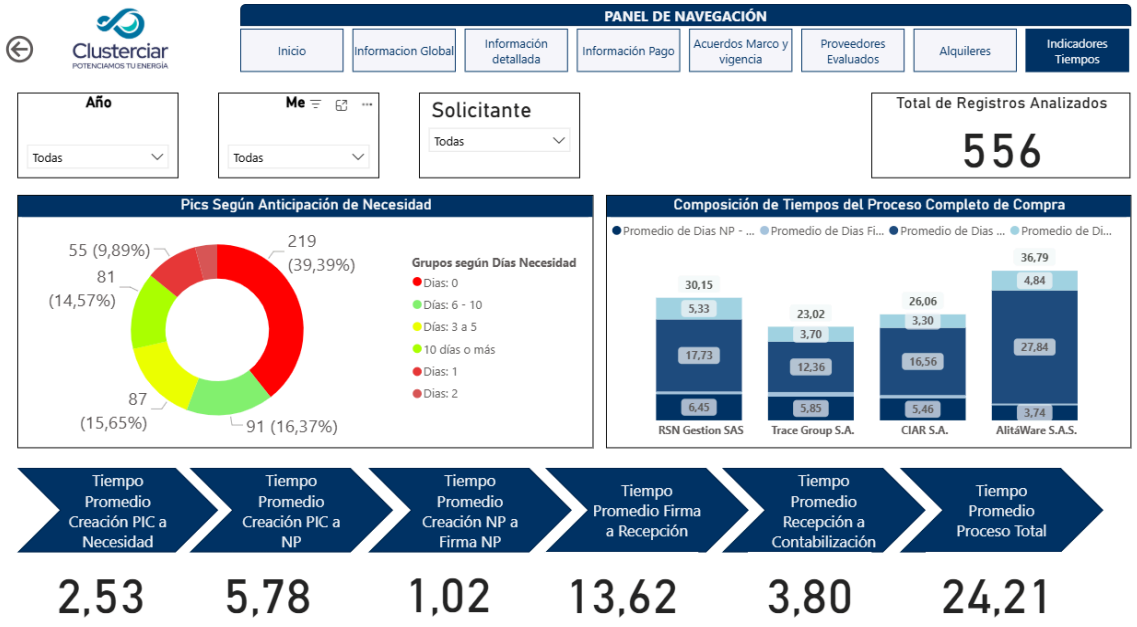
Encuesta_Satisfacción_Abastecimiento_2025_(respuestas)

3. Results

Analysis of historical purchasing records produced precise information on average lead times at each stage and the main causes of delay. In total, 556 records were analyzed, corresponding to requests processed by the Supply area during the evaluation period.

Power BI visuals show that the average total purchasing cycle is 24.21 days, from the creation of the internal request (Pedido Interno de Compra, PIC) to final posting. Within this total, the following stages stand out:

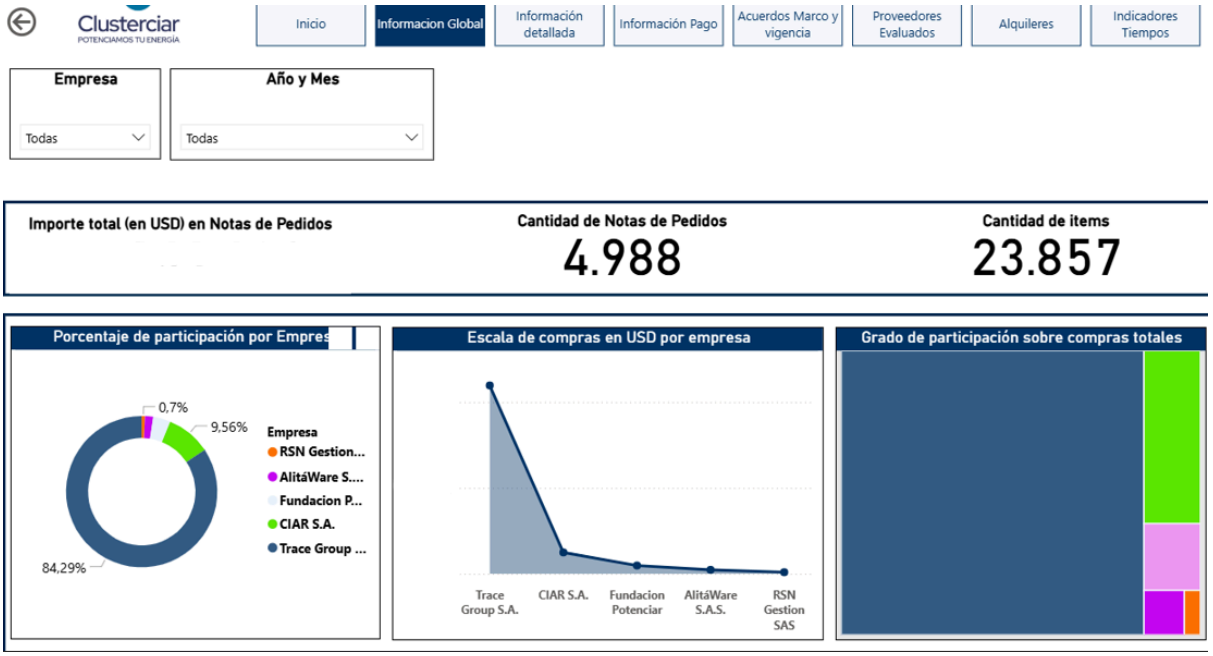
- PIC creation to need date: 2.53 days.
- PIC creation to Purchase Order (NP): 5.78 days.
- Creation to NP signature: 1.02 days.
- NP signature to invoice linkage: 13.62 days.
- Receipt to posting: 3.80 days.



These results show that the greatest delays are concentrated between the creation/signature of the Purchase Order and the receipt of the invoice and its subsequent linkage to the document, which suggests possible delays on the part of suppliers, the ABA/ADM

management areas, or internal approval and follow-up processes. Another observation concerns request anticipation. The pie chart shows that almost 53% of requests are made with no anticipation or with only 1 to 3 days. This pattern confirms limited preventive planning, which increases operational pressure and affects process efficiency. In contrast, the initial (request creation) and final (posting) stages show more controlled times.

Time composition by company reinforces this trend: companies such as RSN Gestión S.A.S. and Trace Group S.A. record lead times above the general average, while CIAR S.A. and Alitaware S.A.S. show more agile processes, likely due to lower workload or different requirements.



To complement the quantitative analysis obtained from the Power BI dashboard, a satisfaction survey was administered to internal clients of the Supply area. The questionnaire included closed questions with rating scales and one open question to collect comments and suggestions about the area's management. Its objective was to survey perceptions regarding response times, clarity of the approval flow, and interdepartmental communication.

Results show an intermediate assessment of the area's performance: most respondents consider response times adequate but acknowledge delays in approvals and material delivery. Several participants highlighted staff goodwill and empathy, while pointing to the need for greater follow-up and communication with requesters. Open responses converged in proposing reduced approval times for Purchase Orders (NP) and improved purchase planning, reinforcing the findings from the dashboard indicators as well as the main motivation for implementing the dashboard: the request to "implement KPIs for the points that make up the process."

Encuesta_Satisfacción_Abastecimiento_2025_(respuestas)

4. Discussion

The results from the analysis of historical records make it possible to precisely characterize purchasing performance and provide empirical evidence supporting the adoption of

KPI dashboards. The average total cycle (24.21 days) aligns with the literature's diagnosis warning of inefficiencies when integrated measurement and visualization systems are absent; in particular, the NP–invoice linkage stage concentrates most of the delay, suggesting bottlenecks in the supplier–Supply (ABA/ADM) interaction and/or in internal approval and follow-up flows. These findings are consistent with approaches that view KPIs as mechanisms for operational–strategic alignment and for variability reduction in complex administrative processes, and with the role of business intelligence technologies in accelerating the decision–action cycle through visualizations and alerts.

The distribution of request anticipation (53% with 0–3 days) offers a structural explanation for part of the delays: low planning by the areas requesting Internal Purchase Requests (PICs) shifts control to formal approval instances and, in turn, to the Supply area, which must first verify the need and the information entered in the request before beginning its own operational work. From a management standpoint, this reinforces the need for early planning policies for requesters and framework agreements or contracts with suppliers, so that if such planning is not in place, the Supply area can respond or adapt quickly and meet requirements without incurring excessive delays.

Heterogeneity by company (e.g., longer lead times in RSN Gestión S.A.S. and Trace Group S.A. vs. shorter in CIAR S.A. and Alitaware S.A.S.) suggests that workload, the complexity of the purchase mix, and follow-up practices condition performance; therefore, the dashboard should not only monitor global averages but also segment by business unit and, likewise, by supplier, in order to produce more precise and specific reporting.

The contrast with qualitative evidence supports the above interpretation. The internal-client survey indicates intermediate assessments and points to delays in approvals and deliveries, as well as the need for a formal follow-up method; these perceptions triangulate with the time peaks detected by the dashboard and with the high share of requests with little or no anticipation. In terms of organizational theory, the convergence between hard indicators and insights from internal users strengthens the construct validity of the dashboard as a management and learning instrument: it measures what actually shapes the "internal client's" experience and the process outcome, reducing the subjectivity of such opinions and serving as their support—or otherwise.

Limitations and possible biases

(i) **Data quality and granularity:** ERP timestamps may be subject to non-homogeneous data-entry practices; errors or omissions affect time estimates. The most frequent case concerns the need date entered in the Internal Purchase Request (PIC).

(ii) **Single-case observational design:** As this is a Neuquén-based SME, generalization should be made with caution; contextual factors such as supplier portfolio, supplier agreements, procedures, or internal policies may not replicate in other organizations.

(iii) **Satisfaction survey:** There is a risk of selection and courtesy bias. While the sample is representative in that it includes internal clients from the five organizations, it does not include the total number of PIC requesters.

(iv) **Uncontrolled factors:** Variables such as request urgency or the

criticality/complications in obtaining the product were not explicitly modeled and could explain part of the variability between process stages and between organizations.

Practical implications

Based on the evidence, four lines of action are recommended:

1. **Reengineering the NP–invoice stage:** Standardize approvals, set automatic reminders for signatories/approvers, and standardize/agree on the electronic submission of documentation by suppliers.
2. **Minimum anticipation policy:** Define anticipation times according to purchase complexity or whether it is a managed/non-managed purchase; analyze historical data to estimate average times for each case and add a two-day margin to set the policy.
3. **Supplier segmentation and performance management:** Establish a supplier score system to guide usage based on ratings. Ratings should reflect parameters such as response speed, product quality, emergency response capacity, and delivery compliance; for suppliers below acceptable thresholds, add improvement plans.
4. **Internal training and impact demonstrations:** Convene the requester network to explain how the system works and which fields/parameters must be completed with greater attention. In addition, demonstrate how each point affects the overall process to highlight the significance of anticipation and data specificity.

Future perspectives

- Improve data quality with mandatory ERP validations (need date, items to be purchased, fields ensuring cross-area consistency).
- Expand the model with explanatory variables (criticality, urgency, managed/non-managed purchase, amount, deadlines, payment terms, among others) and segmentations by business unit and/or supplier.
- Then evaluate the proposed interventions by comparing current indicators with those obtained post-implementation to quantify effects on cycle times and service levels.
- Incorporate AI-supported predictive analytics to flag potential deadline overruns and stockouts, and complement with process mining to map routes, rework, critical approvers, and status checkpoints for the overall process.
- Operationalize the supplier score with performance panels, improvement plans, and incentives; optimize communications and automatic reminders to approvers within the system to avoid multichannel dispersion and keep the flow in a single medium.
- Measure dashboard adoption and return by area and by hierarchical level to analyze whether it enables or supports key decisions for the optimal course of the organizations in the group.

5. Conclusión

The objective of the study was to design and implement a KPI control dashboard in Power BI that would integrate all historical data from the purchasing process and reliably

measure per-stage lead times to support decision-making. The objective was achieved: information from the Finnegans GO ERP was consolidated, key indicators were calculated, and dominant bottlenecks were identified at different points in the process—some reinforced by low request anticipation (an indicator also obtained with the dashboard) and by heterogeneity across companies. Triangulation with the internal-client survey validated the diagnosis and guided improvement areas in approvals, follow-up, and communication.

The main contribution of the work is to provide this organization with a replicable operational–strategic instrument that transforms dispersed data into actionable information, establishing a quantitative baseline to manage performance and prioritize interventions. From a managerial perspective, the conclusions lead to four immediate decisions: (i) redesign the NP–invoice flow with standardization and reminders; (ii) institute a minimum anticipation policy by category; (iii) manage suppliers by performance with ongoing follow-up; and (iv) implement internal training and impact demonstrations.

Therefore, the evidence supports that systematic measurement through KPIs and dynamic visualization is a necessary condition to reduce cycle times and increase the reliability of the supply process. While generalization requires caution due to the single-case nature and data limitations, the proposed approach lays solid foundations for causal evaluations of interventions and for evolving toward new ways of working and analyzing aligned with available technology—signaling digital maturity in the Supply area.

Literature

Elena Marsovna Deberdieva, A. (2015). *Key Performance Indicators as an Instrument of Achieving Strategic Indicators of Oil and Gas Producers.*

Naikwadi, J. F., & Shende, A. (2025). *Unlocking the power of business intelligence in procurement with Power BI*. *International Journal of Research in Management*.

Nunes F., Alexandre E., Gaspar P. D. (2024). *Implementing Key Performance Indicators and Designing Dashboard Solutions in an Automotive Components Company: A Case Study.*

Omotunde Osho G., Olatunde Omisola J., Oluwasegun Shiyanbola J. (2024). *An Integrated AI-Power BI Model for Real-Time Supply Chain Visibility and Forecasting: A Data-Intelligence Approach to Operational Excellence.*

Sherimova, N., Isabekov, B., Alkeev, M., Yermekova, Z., & Ostryanina, T. (2022). An analytical assessment of industrial sector innovative management in the context of digitalization. Journal of Innovation and Entrepreneurship.