DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132
ISSN - 1983-716X

EFFICIENCY AND INNOVATION IN PUBLIC PROCUREMENT: BPM AND DIGITAL GUIDE AT THE FEDERAL INSTITUTE OF AMAPÁ

EFICIÊNCIA E INOVAÇÃO NAS COMPRAS PÚBLICAS: BPM E GUIA DIGITAL NO INSTITUTO FEDERAL DO AMAPÁ

EFICIENCIA E INNOVACIÓN EN LAS COMPRAS PÚBLICAS: BPM Y GUÍA DIGITAL EN EL INSTITUTO FEDERAL DE AMAPÁ

Rilton Correa de Carvalho
Master's Student
Universidade Federal Rural do Rio de Janeiro - Brazil
rilton.carvalho@ifap.edu.br

Maria Cristina Drumond e Castro
PhD
Universidade Federal Rural do Rio de Janeiro - Brazil
cristina@ufrrj.br

Sandro Luis Freire de Castro Silva
PhD
Universidade Federal Rural do Rio de Janeiro - Brazil
sandro@ufrrj.br

Submitted on: 07/31/2025
Approved in: 01/30/2026

ABSTRACT

Objective: This study analyzes IFAP's procurement flow through the lens of Business Process Management (BPM) and proposes a digital guide to support the planning phase, aiming to reduce rework, clarify responsibilities, and improve internal lead times.

Context: Law No. 14,133/2021 increased requirements related to planning, role definition, and document verification. The Federal Institute of Amapá (IFAP) operates within a multi-campus structure and faces recurring returns (i.e., process files sent back between departments for correction or supplementation) and delays associated with incomplete process inputs. Guidelines issued by the Federal Court of Accounts (TCU) and models from the IPPC reinforce the importance of standardization and segregation of duties, creating an opportunity to organize minimum documentation requirements and phase-based verification steps through a digital guide.

Diagnosis: The study is based on documentary analysis of eleven administrative procurement processes at IFAP and benchmarking with fifty-four federal institutions, guided by a comparative method. The analysis identified redundancies, interdepartmental returns, and reliance on tacit knowledge, supporting the prioritization of input control in the planning phase.

Practical implications: The proposed guide organizes minimum planning documents, links tasks to verification points, and enables phase-based consultation, contributing to the reduction of returns and processing times.

Social implications: The centralization of workflows and regulatory references enhances transparency and supports social oversight and institutional monitoring.

Theoretical implications: The study demonstrates the applicability of BPM to public procurement in the context of federal educational institutions.

Originality/Value: The digital guide structures the planning phase by connecting minimum documentation requirements to an operational sequence and to phase-based verification steps. External comparison positions IFAP within a broader institutional context and informs the adoption of observed practices.

Keywords: Business Process Management; Public Procurement; Public Administration; Information Technology.

Como citar: de Carvalho, R. C., Castro, M. C. D. e, & Silva, S. L. F. de C. (2026). Efficiency and Innovation in Public Procurement: BPM and Digital Guide at the Federal Institute of Amapá. Alcance (online), 33(1), 118-134. https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-134

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

RESUMO

Objetivo: Analisar o fluxo de compras do IFAP à luz da Gestão por Processos e propor um guia digital de apoio à fase de planejamento, para reduzir retrabalho, ordenar responsabilidades e melhorar os prazos internos.

Contexto: A Lei n. 14.133, de 2021, elevou as demandas de planejamento, definição de papéis e verificação de documentos para as compras públicas. As Diretrizes do Tribunal de Contas da União (TCU) e os modelos do IPPC reforçam a padronização e a segregação de funções, oferecendo a oportunidade de ordenar documentos mínimos e verificações por fase, apoiados por um guia digital. O Instituto Federal do Amapá (IFAP) opera sob estrutura multicampi e registra devoluções e atrasos associados a entradas incompletas de documentos em processos de compras públicas.

Diagnóstico: Realizou-se a análise documental de onze processos administrativos do IFAP e o benchmarking com cinquenta e quatro instituições federais, com base em método comparativo. Identificaram-se redundâncias, retornos entre setores e dependência de conhecimento tácito, o que sustentou a priorização do controle das entradas do planejamento.

Implicações práticas: O guia desenvolvido organiza os documentos mínimos do planejamento, vincula tarefas a pontos de verificação e permite consulta por fase, o que tende a reduzir devoluções e prazos.

Implicações sociais: A centralização de fluxos e de normativos amplia a transparência e favorece o controle social e o acompanhamento institucional.

Implicações teóricas: Demonstra a aplicabilidade da Gestão por Processos às compras públicas no contexto das instituições federais de ensino.

Originalidade/Valor: O guia digital estrutura a fase de planejamento, conectando os documentos mínimos a uma sequência operacional e às verificações por fase. A comparação externa posiciona o IFAP e orienta a adoção de práticas observadas.

Palavras-chave: Gestão por Processos; Compras Públicas; Administração Pública; Tecnologia da Informação.

RESUMEN

Objetivo: Analizar el flujo de compras del IFAP desde la perspectiva de la Gestión por Procesos y proponer una guía digital de apoyo para la fase de planificación, a fin de reducir retrabajos, ordenar las responsabilidades y mejorar los plazos internos.

Contexto: La Ley 14.133/2021 elevó las exigencias en materia de planificación, definición de roles y verificación documental. El IFAP opera con una estructura multicampus y registra devoluciones y demoras asociadas a entradas incompletas. Las directrices del TCU y los modelos del IPPC refuerzan la estandarización y la segregación de funciones, lo que abre oportunidad para ordenar documentos mínimos y verificaciones por fase, con respaldo de una guía digital.

Diagnóstico: Se realizó un análisis documental de once procesos administrativos del IFAP y un benchmarking con cincuenta y cuatro instituciones federales, orientado por el método comparativo. Se identificaron redundancias, devoluciones entre sectores y dependencia de conocimiento tácito, lo que sustentó la priorización del control de las entradas de la planificación.

Implicaciones prácticas: La guía organiza los documentos mínimos de la planificación, vincula las tareas a los puntos de verificación y permite la consulta por fase, lo que tiende a reducir devoluciones y plazos.

Implicaciones Sociales: La centralización de flujos y normativas aumenta la transparencia y favorece el control social y el seguimiento institucional.

Implicaciones teóricas: Muestra la aplicabilidad de la Gestión por Procesos en las compras públicas en el contexto de las instituciones federales de educación.

Originalidad/Valor: La guía digital estructura la fase de planificación al conectar los documentos mínimos con una secuencia operativa y con verificaciones por fase. La comparación externa posiciona al IFAP y orienta la adopción de las prácticas observadas.

Palabras clave: Gestión por Procesos; Compras Públicas; Administración Pública; Tecnologías de la Información.

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

INTRODUCTION

Public procurement enables the implementation of public policies and mobilizes a share of gross domestic product, thereby influencing management and economic development (Ribeiro & Inácio Júnior, 2019). Government purchasing power shapes markets, stimulates production chains, and can promote sustainable practices in procurement (Melo, 2018). This role requires the structuring of rules, routines, and responsibilities to ensure that lead times, costs, and deliveries remain under control within the analyzed institution.

Law No. 14,133/2021 reorganized procurement stages and unified regulatory frameworks, requiring institutional adaptation and the revision of procedures (Feliciano & Verbicaro Soares, 2023). Its implementation demands staff training and the adoption of arrangements that support the continuous application of the new regulatory regime (Moreira et al., 2023).

The Federal Court of Accounts (TCU) recommends the formalization of processes for planning, supplier selection, and contract management, with clearly defined responsibilities, segregation of duties, standardized templates, and checklists. It also recommends the establishment of procurement policies and risk management guidelines, supported by collegial bodies to assist decision-making. These practices reduce inconsistencies and align procurement activities with institutional objectives (TCU, 2023).

The Federal Institute of Amapá (IFAP) operates within a multi-campus structure and has implemented procurement centralization initiatives, including annual planning and the use of official systems (IFAP, 2020). However, gaps in integration between units persist, as well as the absence of a structured tool to organize planning documents in a logical sequence, which contributes to returns and delays. The analysis considers administrative processes from 2023 to 2024, defining the reference period for the study.

There is an opportunity to structure the planning phase within a unified repository that integrates workflows, documents, and guidelines in a logical sequence with simplified access. This opportunity arises from both centralization efforts and evidence of rework that can be mitigated through standardization and early verification of process inputs.

This opportunity is addressed through Business Process Management (BPM), applied to map, analyze, and redesign workflows, followed by the implementation of a digital guide that links tasks, documents, and verification points. External comparison draws on practices implemented in federal institutes and universities and informs decision-making through benchmarking and the comparative method, based on defined axes of contrast and inclusion criteria (Spendolini, 1993; Schneider & Schmitt, 1998).

The relevance of this study lies in the role of public procurement in policy implementation and economic development, which requires structured routines aligned with the current legal framework (Ribeiro & Inácio Júnior, 2019; Melo, 2018; Feliciano & Verbicaro Soares, 2023). The integration between theory and practice is achieved through the application of BPM at IFAP, translating regulatory requirements into tasks, documents, and verification mechanisms organized in a logical sequence.

From a scientific perspective, this study aims to analyze IFAP's procurement flow through the lens of BPM and to systematize evidence regarding inputs, responsibilities, and verification points based on administrative records and the current legal framework. From a practical perspective, it proposes a digital guide to support the planning phase, aiming to organize documents and tasks, reduce returns, and improve internal lead times, in alignment with Law No. 14,133/2021.

CONTEXT AND RESEARCHED REALITY

The Federal Institute of Amapá (IFAP), established in 2008 as part of the Federal Network of Professional Education, operates within a multi-campus structure and faces challenges typical of decentralized management in public procurement. These weaknesses in procurement flows compromise lead times and contracted outcomes, directly affecting the institution's ability to fulfill its educational mission.

Until 2020, each campus conducted part of its procurement processes with relative autonomy. Beginning in 2012, a cooperative model of shared procurement was implemented, in which the Rector's Office coordinated joint bidding pro-

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

cedures, generating economies of scale without eliminating the autonomy of individual units to formalize contracts.

In subsequent years, IFAP sought to improve procurement coordination. In 2017, the Annual Procurement Agenda was adopted to integrate institutional procurement planning. Normative Instruction No. 1/2019, issued by the Ministry of Economy, required all procurement requests to be registered in the Procurement Planning and Management System (PGC), forming the basis for the Annual Procurement Plan (PCA). In parallel, Ordinance No. 13,623/2019 encouraged procurement centralization, reducing the number of Administrative Services Units (UASG) to improve efficiency and control.

In response, IFAP formalized its Procurement Centralization Plan in 2020, transferring responsibility for conducting bidding procedures to the Rector's Office and gradually deactivating campus-level Administrative Services Units (UASG). This transition to a centralized model was supported by integrated systems, such as the Integrated System of General Services Administration (SIASG) and the Price Registration System (SRP), enabling unified procurement procedures and economies of scale. Additionally, the Electronic Procurement and Contracting System (SISCOMP) was implemented to centralize procurement demands, increasing transparency and procedural agility while supporting decision-making.

Despite these organizational advances, challenges persist in achieving full integration across campuses and maintaining efficiency in procurement processes. The implementation of the PGC highlighted the need to strengthen procurement management at IFAP by consolidating planned procurements and aligning acquisitions with budgetary constraints and strategic guidelines. In other words, even with new tools and regulatory instruments, there remains room to reduce overlapping activities, rework, and inefficient communication between departments.

In this context, the adoption of BPM practices becomes essential to map, analyze, and optimize internal processes, promoting greater agility and effectiveness in public procurement management. As highlighted by Silva Júnior and Fernandes (2023), process modeling enables the identification of bottlenecks, the elimination of unnecessary activities, and the implementation of technological solutions that automate steps and enhance transparency.

This process-oriented approach tends to strengthen governance and administrative efficiency at IFAP by integrating dispersed knowledge into standardized and accessible procedures for all stakeholders involved.

IAGNOSIS OF THE PROBLEM SITUATION

Data collection was conducted through documentary analysis, based on criteria of authenticity, credibility, representativeness, and meaning, as defined by Bowen (2009). The empirical scope comprised eleven IFAP administrative processes, with procedures recorded between 2023 and 2024. External comparison followed the comparative method proposed by Schneider and Schmitt (1998) and the benchmarking protocol developed by Spendolini (1993).

Many managers face complex challenges ranging from structuring and conducting bidding procedures to implementing policies aimed at promoting local development and sustainability. In Brazil's public procurement system, several difficulties hinder its functioning, particularly the lack of a clear organizational structure and a precise definition of roles, which undermines procurement efficiency (Fernandes, 2019).

IFAP's procurement flows in their current state were mapped based on administrative records and procedural documents. The analysis adhered to the criteria of documentary analysis, applied to evidence selection and analytical decisions.

To define the sample and organize data analysis, a descriptive design with a case study approach was adopted, following Gil (2022), who recommends the use of descriptive statistics (mean, median, and dispersion) to summarize data series and support qualitative interpretation in organizational contexts.

The analysis of the eleven internal processes revealed redundant activities and operational bottlenecks that impaired administrative efficiency. Recurring issues were identified across multiple stages, from procurement planning to contract execution, resulting in delays, rework, and resource waste. Table 1 summarizes the processes examined.

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

Table 1
Summary of the Analyzed Processes

Process Number	Procurement Object	Procurement Method	Internal Phase Duration (days)	Rework	Total processing time (days)	Critical Issues
23228.000371.2023-27	Service	Electronic reverse auction – Price Registration System (SRP)	93	Yes	119	Delay in price research; Legal adjustments; Incomplete documentation
23228.000740.2023-81	Goods acquisition	Electronic reverse auction – SRP	388	Yes	424	Scope redefinition; Delay in price research
23228.000407.2023-72	Goods acquisition	Electronic reverse auction – SRP	333	Yes	427	Delay in price research; Document supplementation; Interdepartmental transfer
23228.000448.2023-69	Service	Electronic reverse auction – SRP	617	Yes	710	Delay in price research; Legal adjustments; Demand consolidation
23228.000449.2023-11	Service	Electronic reverse auction – SRP	219	Yes	244	Legal adjustments; Document supplementation; Interdepartmental transfer
23228.000980.2021-14	Service	Electronic reverse auction – SRP	348	Yes	582	Demand consolidation; Incomplete documentation
23228.000988.2022-61	Service	Electronic reverse auction – SRP	223	Yes	318	Document supplementation; Scope redefinition
23228.001364.2024-23	Service	Electronic reverse auction – SRP	99	Yes	227	Legal adjustments; Demand consolidation
23228.001462.2024-61	Service	Electronic reverse auction – SRP	71	Yes	142	Multiple interdepartmental returns; Document adjustments
23228.001643.2024-97	Service	Electronic reverse auction – SRP	140	Yes	274	Multiple adjustments between the Legal Affairs Office (PROJUR) and other departments; Late submission of Service Requests (SCS) and Material Requests (SCM)
23228.001653.2024-22	Service	Electronic reverse auction – SRP	250	Yes	322	Legal adjustments; Demand consolidation

Source: Institutional data (2025).

These documentary redundancies and poorly defined roles led to "document supplementation" and "multiple interdepartmental returns," situations in which documents were repeatedly sent back and forth between departments due to incomplete or incorrect information.

Table 2 summarizes the mean, median, standard deviation, minimum, and maximum values for internal phase duration and total processing time, calculated from eleven processes recorded in the Unified Public Administration System (SUAP). These indicators establish the baseline for the evaluation, which will follow three axes: reduction of internal phase duration, total processing time, and the frequency of rework, in accordance with Law No. 14,133/2021.

Table 2
Condensed Results

Variable	Mean (days)	Median (days)	Standard deviation (days)	Minimum (days)	Maximum (days)
Internal Phase Duration	253	223	162	71	617
Total Processing Time	345	318	180	119	710
Rework (relative frequency)	-	-	-	100%	100%

Source: Authors' elaboration (2025).

The internal phase showed an average duration of 253 days, with rework occurring in 100% of the cases, which, according to Gil (2022), supports the use of simple indicators to guide gradual interventions in the process.

The recurring causes are concentrated in slow price research, document supplementation, legal adjustments, and interdepartmental returns, supporting the need to review artifacts and roles, as shown in Table 2. Similar findings are reported

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

when documentary inputs do not meet minimum requirements and generate rework across departments (Costa et al., 2019).

These findings are consistent with international references on BPM applied to public procurement, such as Gulledge and Sommer (2002), who argue that coordination between departments and the explicit definition of roles reduce waiting times and rework by aligning activities and artifacts with process performance.

The BPM lifecycle guides the transition from AS-IS to TO-BE through modeling, analysis, redesign, and automation, providing the basis for the methodological pipeline for process redesign (Dumas et al., 2018). These contributions will be applied in the analysis section.

In a digital government context, aligning solutions with the institutional environment avoids mechanical transpositions and supports decision-making aligned with the institutional context (Janowski, 2015). In GovTech, a citizen-centered approach and coordinated government action prioritize simplification, integration, and transparency (World Bank, 2020), which justifies the Digital Guide as an operational support for procurement flows. These references define the criteria for selecting minimum artifacts by phase and by verification points. This context reinforces that, in the absence of clear guidance and standardization, tacit knowledge and fragmented information negatively affect process performance.

To position the findings and guide the design of the TO-BE state, a documentary benchmarking was conducted with 54 institutions (27 Federal Institutes and 27 federal universities). The sample scope, sources, and inclusion criteria are described in Box 1. The nominal list of Federal Institutes included in the benchmarking is presented below to ensure sample traceability; the list of federal universities is provided in Box 2.

Box 1

Federal Institutes Included in the Benchmarking

Institution	Documents Identified (DI)	Legal Framework Applied in DI
Federal Institute of Acre (IFAC)	No documents identified (page under construction).	Law No. 8,666/1993; Law No. 14,133/2021
Federal Institute of Amazonas (IFAM)	PGC manuals; compras.gov.br platform manual; standardization instruments from the Office of the Attorney General (AGU); guidance notes	Law No. 14,133/2021
Federal Institute of Pará (IFPA)	No documents identified.	-
Federal Institute of Rondônia (IFRO)	Contract Management and Oversight Manual; Internal Ordinance on Shared Procurement.	Law No. 8,666/1993
Federal Institute of Roraima (IFRR)	No documents identified.	-
Federal Institute of Tocantins (IFTO)	Partial procedure for contract management and oversight.	Law No. 8,666/1993; Law No. 14,133/2021
Federal Institute of Mato Grosso (IFMT)	Resolution establishing the Licita IFMT program for the procurement of goods and services; Standard Operating Procedures (SOPs) for selected bidding methods, including those under Law No. 8,666/1993.	Law No. 8,666/1993; Law No. 14,133/2021
Federal Institute of Goiás (IFG)	No documents identified.	-
Federal Institute of Brasília (IFB)	Ordinance regulating the Annual Procurement Plan (PCA); SOP for contract issuance; guidelines for accessing the procurement and contracts dashboard.	Law No. 8,666/1993; Law No. 14,133/2021
Federal Institute of Southern Minas Gerais (IFSULDEMINAS)	Legislation; guidelines; templates; flowcharts (without BPM standards); ordinances; guidance notes.	Law No. 14,133/2021; Law No. 8,666/1993
Federal Institute of Espírito Santo (IFES)	No documents identified.	-
Pedro II School (CP2)	No documents identified.	-
Federal Institute of São Paulo (IFSP)	Procurement and Contracts Manual available in digital and interactive format.	Law No. 14,133/2021
Federal Institute of Paraná (IFPR)	Document templates from the Office of the Attorney General of Brazil (AGU)	Law No. 14,133/2021
Federal Institute of Santa Catarina (IFSC)	No documents identified.	-
Federal Institute Sul-rio-grandense (IFSul)	Contract Management and Oversight Manual; normative instructions for materials procurement.	Law No. 14,133/2021
Federal Institute of Maranhão (IFMA)	Procurement Centralization Plan; procedure manuals; administrative process flowcharts; internal regulations; procurement guidelines.	Law No. 8,666/1993
Federal Institute of Piauí (IFPI)	Procurement and Bidding Manual; Contract Management and Oversight Manual; normative instruction on centralized procurement.	Law No. 8,666/1993
Federal Institute of Bahia (IFBA)	AGU procurement procedures manual; normative guidelines.	Law No. 8,666/1993; Law No. 14,133/2021
Federal Institute of Ceará (IFCE)	Various flowcharts and scope diagrams in Business Process Model and Notation (BPMN) for contract registration.	Law No. 8,666/1993; Law No. 14,133/2021
Federal Institute of Rio Grande do Norte (IFRN)	Normative Instruction on the composition and operation of Procurement and Contracting Units; Public Procurement and Contracting Centralization Plan.	Law No. 8,666/1993
Federal Institute of Paraíba (IFPB)	Procedures manual (2016); planning-phase artifact templates (2016–2018).	Law No. 8,666/1993
Federal Institute of Pernambuco (IFPE)	Normative instructions regulating shared procurement procedures.	Law No. 8,666/1993
Federal Institute of Alagoas (IFAL)	Procurement Manual; internal normative ordinances; flow for the contract planning phase (BPMN); flow for the renegotiation of centralized contracts (BPMN); flow for the appointment of contract inspectors (BPMN)	Law No. 8,666/1993; Law No. 14,133/2021
Federal Institute of Sergipe (IFS)	Normative guidelines for initiating procurement or service contracting processes.	Law No. 14,133/2021
Federal Institute of Amapá (IFAP)	Public Procurement Centralization Plan; Contract Management and Inspection Manual; flowcharts from the Contract Management and Inspection Manual.	Law No. 8,666/1993
Federal Institute of Mato Grosso do Sul (IFMS)	Normative instructions; normative guidelines.	Law No. 14,133/2021

Source: Authors' elaboration (2025).

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

Subsequently, the federal universities analyzed are listed as part of the set of institutions evaluated.

Box 2

Federal Universities Included in the Benchmarking

Institution	Documents Identified (DI)	Legal Framework Applied in DI
Federal University of Acre (UFAC)	Ordinances regulating the calendar and the Annual Procurement Plan for the procurement of goods within the University.	Law No.14,133/2021
Federal University of Alagoas (UFAL)	Flowchart in BPMN for the electronic reverse auction process.	Law No. 14,133/2021
Federal University of Amapá (UNIFAP)	Guidance booklet for procurement; bidding and contract templates - AGU; manuals of the Integrated System for Assets, Administration, and Contracts (SIPAC) and materials catalogs.	Law No. 14,133/2021
Federal University of Amazonas (UFAM)	DEMAT Manual (guide to forms and instructions), outlines the internal workflow. Various document templates. Internal ordinance.	Law No. 8,666/1993; Law No. 14,133/2021
University of Brasília (UNB)	Manuals and external webinars on the phases of the public procurement metaprocess, as well as digital artifacts produced by the Ministry of Management and Innovation (MGI).	Law No. 14,133/2021
Federal University of Bahia (UFBA)	Procedures Manual – SOPs.	Law No. 14,133/2021
Federal University of Ceará (UFC)	Procedures Manuals.	Law No. 14,133/2021
Federal University of Espírito Santo (UFES)	Procurement Procedures Manual.	Law No. 14,133/2021
Federal University of Goiás (UFG)	Procurement manual with BPMN flowcharts; BPM modeling; SOPs.	Law No. 14,133/2021
Federal University of Maranhão (UFMA)	Manuals and external webinars on the phases of the public procurement metaprocess, as well as digital artifacts produced by the Ministry of Management and Innovation (MGI).	Law No. 14,133/2021
Federal University of Mato Grosso (UFMT)	Manuals and external webinars on the phases of the public procurement metaprocess, as well as digital artifacts produced by MGI.	Law No. 14,133/2021
Federal University of Mato Grosso do Sul (UFMS)	Mapping of procedures with links to waiver procedures and sole-source procurement.	Law No. 14,133/2021
Federal University of Minas Gerais (UFMG)	Administrative Procedures Manual.	Law No. 8,666/1993
Federal University of Pará (UFPA)	BPMN flowcharts of CCN processes: waiver and quotation; waiver for services and sole-source procurement; electronic reverse auction and public call.	Law No. 8,666/1993
Federal University of Paraíba (UFPB)	Procurement and administrative contracting manual; purchase request procedure; artifact templates (DFD, Preliminary Technical Study - ETP, Risk Matrix).	Law No. 14,133/2021
Federal University of Paraná (UFPR)	Internal normative instructions; standardization instrument for procurement procedures; artifact templates (AGU).	Law No. 14,133/2021
Federal University of Pernambuco (UFPE)	BPMN diagrams for the phases of the public procurement metaprocess (internal procedures): direct contracting and Price Registration Record (ARP)	Law No. 14,133/2021
Federal University of Piauí (UFPI)	No documents identified.	-
Federal University of Rio de Janeiro (UFRJ)	Flowcharts without standardized BPMN notation; internal ordinances on procedures.	Law No. 8,666/1993
Federal University of Rio Grande do Norte (UFRN)	Strategic Plan of the Procurement Directorate; contracting artifact templates.	Law No. 8,666/1993
Federal University of Rio Grande do Sul (UFRGS)	No documents identified.	-
Federal University of Rondônia (UNIR)	Procurement and Contracting Procedures Manual; ordinance establishing procedures for the procurement of goods and the contracting of services.	Law No. 14,133/2021
Federal University of Roraima (UFRR)	Procurement Manual.	Law No. 14,133/2021
Federal University of Santa Catarina (UFSC)	Procurement Manual – interactive wiki-based guide	Law No. 14,133/2021
Federal University of São Paulo (UNIFESP)	Procurement and Contracting Manual.	Law No. 14,133/2021
Federal University of Sergipe (UFS)	SOPs for procurement processes; procurement guidebook.	Law No. 8,666/1993; Law No. 14,133/2021
Federal University of Tocantins (UFT)	No documents identified.	-

Source: Authors' elaboration (2025).

These elements supported the selection of intervention alternatives, as well as the design of the future process and the structuring of minimum planning artifacts. The benchmarking was conducted following a systematic protocol for comparison among similar peers (Spendolini, 1993). To situate the IFAP findings, the scope of the documentary benchmarking conducted with 54 institutions is presented, indicating the sources and inclusion criteria, as shown in Table 3.

Table 3

Empirical scope

Type of Institution	Documentary Availability (Regulatory Documents)	Alignment with Law No. 14,133/2021	BPM Modeling	Observation
Federal Institutes (IFs)	74 %	48%	11 %	Heterogeneity and greater resistance to regulatory updating; more than half (51.9%) still combine or exclusively use Law No. 8,666/1993.
Federal Universities (UFs)	89 %	82 %	22 %	Greater regulatory alignment and more advanced updating; a minority (18.5%) is still partially guided by Law No. 8,666/1993.

Source: Authors' elaboration (2025).

This scope guides the comparative reading in the diagnostic and will serve as the basis for the selection of alternatives in the analysis section. The Internal Procedures Guide (GIP) prescribes up to 38 steps in the planning phase. The comparison between the prescribed process and the executed practice reveals gaps in the sequence of activities and in the quality of documentary inputs. According to the national literature, reducing handoffs between departments, consolidating input documents, and anticipating verification steps tend to reduce returns (Cruz et al., 2020). These points will be translated into design requirements in the TO-BE.

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

To address the identified causes and guide the design of the TO-BE, artifact standardization by phase is adopted. Box 3 was developed based on the Standardization Instruments for Procurement Procedures (IPPC), created by the Office of the Attorney General of Brazil (AGU), in partnership with the Ministry of Management and Innovation in Public Services (MGI). The content outlines the essential documents for the procurement planning phase, their objectives, and responsible actors, enabling greater uniformity and improved administrative organization.

Box 3

Minimum Documents for Procurement Planning

N.	Document	Essential Objective	Responsible
1	Demand Formalization Document (DFD)	Record the need and estimate preliminary quantity and cost	Requesting department
2	Ordinance establishing the Procurement Planning Team (EPC)	Formalize the EPC	Competent authority
3	Preliminary Technical Study (ETP)	Demonstrate feasibility and serve as the basis for the Terms of Reference	EPC
4	Risk Analysis	Identify and classify risks related to the procurement object	EPC
5	Price Research Spreadsheet	Conduct market research to consolidate price estimates	EPC
6	Technical Note on Price Research	Evaluate the price research	EPC
7	Declarations of Budget Availability and Adequacy	Confirm budget allocation	Financial department
8	Act designating the Contracting Agent and support team	Appoint those responsible for the procurement procedure	Competent authority
9	Signed Terms of Reference (TR)	Detail requirements and contractual management criteria	EPC
10	Draft Notice	Define participation and evaluation rules	Contracting Agent / EPC
11	Draft Contract, where applicable	Establish execution clauses	Contracting Agent / EPC
12	Draft Price Registration Record (ARP), where applicable	Formalize commitments under the Price Registration System (SRP)	Contracting Agent / EPC
13	Declaration of use of AGU–MGI templates	Confirm adoption of official templates; in case of modifications (additions or deletions) by the assisted unit, justification must be presented in the records or directly in the draft act.	EPC
14	Declaration of compliance with the Standardization Instruments for Procurement Procedures (IPPC) of AGU/MGI	Confirm adoption of official templates; justification must be provided in the records or directly in the draft act in case of modifications (additions or deletions) by the responsible unit	EPC
15	Authorization for procurement	Formalize administrative decision	Competent authority (Rector/Campus Director)
16	AGU Checklist	Verify completeness before legal review	Contracting Agent / EPC

Source: Authors' elaboration (2025), adapted from IPPC.

The data indicate recurring patterns that can be addressed preventively through the revision of flows, improvements in communication, and the standardization of documents. The diagnostic findings make it clear that the existing regulatory instrument at IFAP (procurement guide) does not achieve its objective of standardizing and streamlining procedures. On the contrary, several conceptual deficiencies in this instrument have translated into measurable practical weaknesses.

In summary, what was intended to facilitate work has become an obstacle to efficient management, resulting in delays and increased costs for the institution. This finding highlighted the urgency of a new intervention: to rethink IFAP's public procurement process in an integrated manner, using a process management approach to simplify flows, eliminate bottlenecks, and institutionalize knowledge in an accessible format.

Regarding the participation of organizational and social actors, this stage was based on official documents and administrative records. No interviews or focus groups were conducted. This limitation was due to delays in the processing of the research project for obtaining approval from the Research Ethics Committee (CEP) of the Federal Rural University of Rio de Janeiro (UFRRJ); it was therefore decided not to use these data collection instruments.

All external data collection was based exclusively on publicly accessible information (institutional portals and published documents), without any direct interaction with staff from the analyzed institutions, thus characterizing a comparative documentary analysis. Therefore, there was no need to submit the study to the ethics committee, in accordance with guidelines applicable to research involving publicly available data.

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

The comparative method described by Schneider and Schmitt was adopted, with the definition of observable units, axes of contrast, and classification rules. The units considered were the institutions of the Federal Network, divided into Federal Institutes (IFs) and Federal Universities (UFs). Three axes of contrast were established, namely documentary availability, alignment with Law No. 14,133/2021, and the use of BPM or BPMN. A coding protocol was applied, with cross-checking of institutional sources. The aggregated results are presented in Box 4.

Box 4

Stages of the Comparative Method

THEORETICAL STAGE	PRACTICAL APPLICATION
Selection of two or more comparable series of phenomena:	Two sets of data were selected for comparison: (i) the AS-IS procurement flow of IFAP, obtained through the mapping of 11 public procurement administrative processes; and (ii) the flows, guidelines, and documents related to procurement practices in 54 other federal institutions (external benchmarking, comprising 27 Federal Institutes and 27 Federal Universities).
Definition of the elements to be compared	Consistent elements of comparison were established, such as the typical phases of the procurement process (planning, bidding, contracting, execution, and control), the institutional roles involved (requesting departments, bidding committee, Contracting Agent, etc.), and the main documents and regulatory instruments adopted. These common criteria (analytical variables) were defined based on BPM literature and institutional specificities, ensuring that each aspect of IFAP's AS-IS flow could be systematically compared with the flows of the other 54 cases.
Generalization	In this study, generalization is reflected in the construction of the TO-BE procurement process model. Based on the synthesis of practices and commonly identified best procedures, general patterns were derived, such as critical stages and more efficient controls, which served as the basis for the proposed future model. Thus, the compared information was translated into broader recommendations and into a unified conceptual flow, concluding the comparative stage with an integrated general model.

Source: Research data (2025).

The documentary benchmarking followed a comparison among similar peers, in accordance with the literature on systematic comparison in organizations (Spendolini, 1993). The nominal listings used for comparison are presented in Boxes 1 and 2, ensuring the traceability of the examined set. The synthesis by axis of contrast organizes percentages of availability, regulatory alignment, and BPM modeling, allowing IFAP to be positioned in relation to the reference group.

The comparison made it possible to relate external patterns to the causes observed at IFAP, such as delays in price research, document supplementation, legal adjustments, and interdepartmental returns. From this analysis derives the priority given to the standardization of planning inputs, presented in Box 3 as the minimum documents for procurement planning. This arrangement preserves coherence between the diagnostic indicators reported in Tables 1 and 2 and the future process design, referred to as TO-BE.

This scenario reinforced the opportunity and originality of developing a digital guide for the planning phase, with consultation pathways and phase-based verification steps, addressing not only IFAP's needs but also potentially serving as a model for other similar institutions.

ANALYSIS OF THE PROBLEM SITUATION AND PROPOSALS FOR INNOVATION/INTERVENTION/RECOMMENDATION

Business Process Management (BPM) was adopted as the guiding approach, with a focus on the planning phase in alignment with Law No. 14,133/2021. This section translates the diagnostic findings into decisions for the design of the future process, prioritizing planning inputs, responsibilities, and verification steps prior to decision-making milestones.

The methodological sequence began with documentary analysis and the statistical description of timeframes and occurrences, progressed to inter-institutional comparison, and returned to the case for the selection of intervention areas. This sequence moved from the mapping of the current state to the definition of inputs, responsibilities, and verification steps, preparing the representation of the future process and the detailing of the technological product that will support institutional adoption.

The empirical reading remains grounded in documentary analysis. Bowen (2009) defines criteria of authenticity, credibility, representativeness, and meaning that guide the selection of alternatives and the articulation between regulatory documents, procedural records, and the results of the external survey, ensuring a direct connection between the evidence and the design decisions presented below.

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

The scope and protocol of the benchmarking are described in the Diagnostic section. The findings support the prioritization of intervention areas, with emphasis on the control of planning inputs and on verification steps prior to administrative decision-making.

The first intervention approach organizes the planning phase based on the minimum set of documents already consolidated in the diagnostic. Box 3 presents the documents, objectives, and responsible actors, based on the IPPC. This set guides procedural processing and reduces interdepartmental returns, as indicated in the framework.

The second intervention approach clarifies transitions, expected outputs, and verification steps before decision-making milestones, maintaining a direct link between each task and its corresponding document. Gulledge and Sommer (2002) emphasize that coordination and clearly defined responsibilities reduce waiting times and rework. The BPMN diagram follows the description of the future process and supports internal consultation.

The third intervention approach aligns the prescribed process with the work actually performed. The institutional series recorded rework across the entire sample and variability in internal and total processing times, which supports the need to control inputs and verify completeness before submission for legal review. Gil (2008) discusses the role of descriptive statistics in organizational studies. Creswell (2017) and Johnson and Onwuegbuzie (2004) address methodological integration without compromising the qualitative nature of the research.

Monitoring targets revisit the diagnostic variables. Reduction of internal phase duration, reduction of total processing time, and a decrease in rework frequency make up the verification panel. Gil (2022) supports the use of medians and ranges as a baseline for periodic evaluation and for the replanning of verification points, when necessary.

This analysis proposes an institutional periodicity for monitoring the three variables, with formal records and review of verification points when deviations from the reference medians are identified.

The technical proposal is materialized in the digital guide, which brings together flows, templates, and references in a single environment. The product consolidates the procedural pathway, links tasks to planning documents, and provides phase-based consultation routes, thereby facilitating institutional adoption. The design presented in the dissertation describes the structure and navigation of the repository and serves as a reference for its implementation and maintenance at IFAP.

The institutionalization of the guide is based on content management and regular updates. The procedure includes the selection of materials, verification of regulatory alignment, version control, and the assignment of responsible parties, with quarterly review. The pages are linked to Box 3 and record, for each update, the date, version number, and regulatory reference, thereby ensuring traceability and proper use.

There are risks associated with procedural differences between departments and staff turnover. To mitigate these risks, the sequence of documentary inputs precedes submission for review, and transitions between units maintain defined verification points. In case of inconsistency, guidance is provided directly on the guide's page, with examples and references, reinforcing standardization and continuity.

The theoretical framework encompasses Business Process Management, public procurement, and information technology. In Business Process Management, Dumas et al. (2018) present the method that leads from the current state to the future state through modeling, analysis, and redesign. In the field of public procurement, AGU and MGI (2021) structure the minimum set of documents that ensures the regularity of the procedure and facilitates legal review. In information technology, Janowski (2015) highlights the importance of aligning digital solutions with the organizational context. Together, these axes integrate design, implementation, and continuous verification.

Expected gains result from the application of the three intervention approaches. Document standardization tends to reduce back-and-forth; the explicit definition of transitions and verification steps provides predictability; alignment between what is prescribed and what is carried out improves timelines and reduces rework. For the organization, the effects impact procedural flow, legal certainty, and knowledge management. For teams and users, the guide expands access to information and guides the day-to-day execution of tasks.

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

PRESENTATION OF THE DIGITAL GUIDE

The digital guide constitutes the technical and technological product of the research and organizes flows, documents, and guidelines in a single environment. The platform selected was Google Sites, as it is an easy-to-use web-based site creation tool that requires no programming and incurs no hosting costs. The structure follows the process management cycle described in the study and is based on the minimum planning documents already presented in the main text. The objective is to support procedural structuring and reduce rework through standardization and phase-based verification.

The homepage presents the title "Procurement Process Flow for Goods and Services and the Annual Procurement Plan (PCA)" and provides navigation links to the main stages of the process, as shown in Figure 1. The organization reflects the "metaprocess" (the overarching procurement process cycle defined by Brazilian federal guidelines) described in the study and incorporates the minimum planning documents identified in the diagnostic. This entry point guides institutional navigation and centralizes access to essential content.

Figure 1

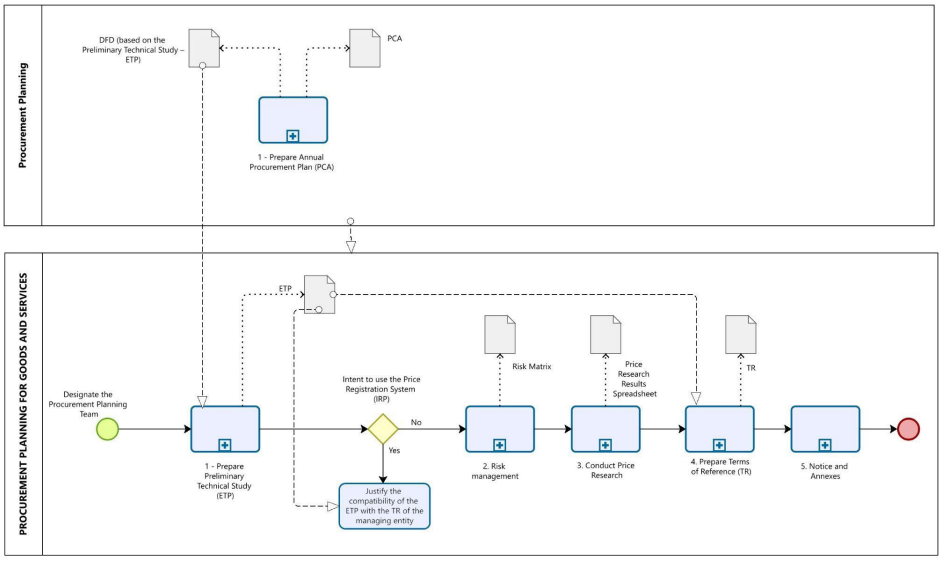
Homepage of the digital procurement guide, showing access to the procurement process flow and the Annual Procurement Plan (PCA), as well as navigation links to phases, templates, and verification points (originally in Portuguese).

Source: Digital Guide PTT IFAP, internal version 2025, unpublished. Available at: https://sites.google.com/view/fluxo-de-contracoes-publicas (accessed in 2025).

Procurement planning presents a sequence of activities, transitions between units, outputs, and completeness checks, as shown in Figure 2. Each task is linked to an artifact from the minimum set of planning documents.

Figure 2

Procurement Planning Flowchart.



Source: adapted from Digital Guide PTT IFAP, internal version (2025), unpublished.

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

The section dedicated to the Annual Procurement Plan (PCA) and Standard Operating Procedures (SOPs) brings together templates and instructions with regulatory references, as shown in Figure 3. The navigation links each procedure to the phases of the process and to the minimum required documents.

Figure 3

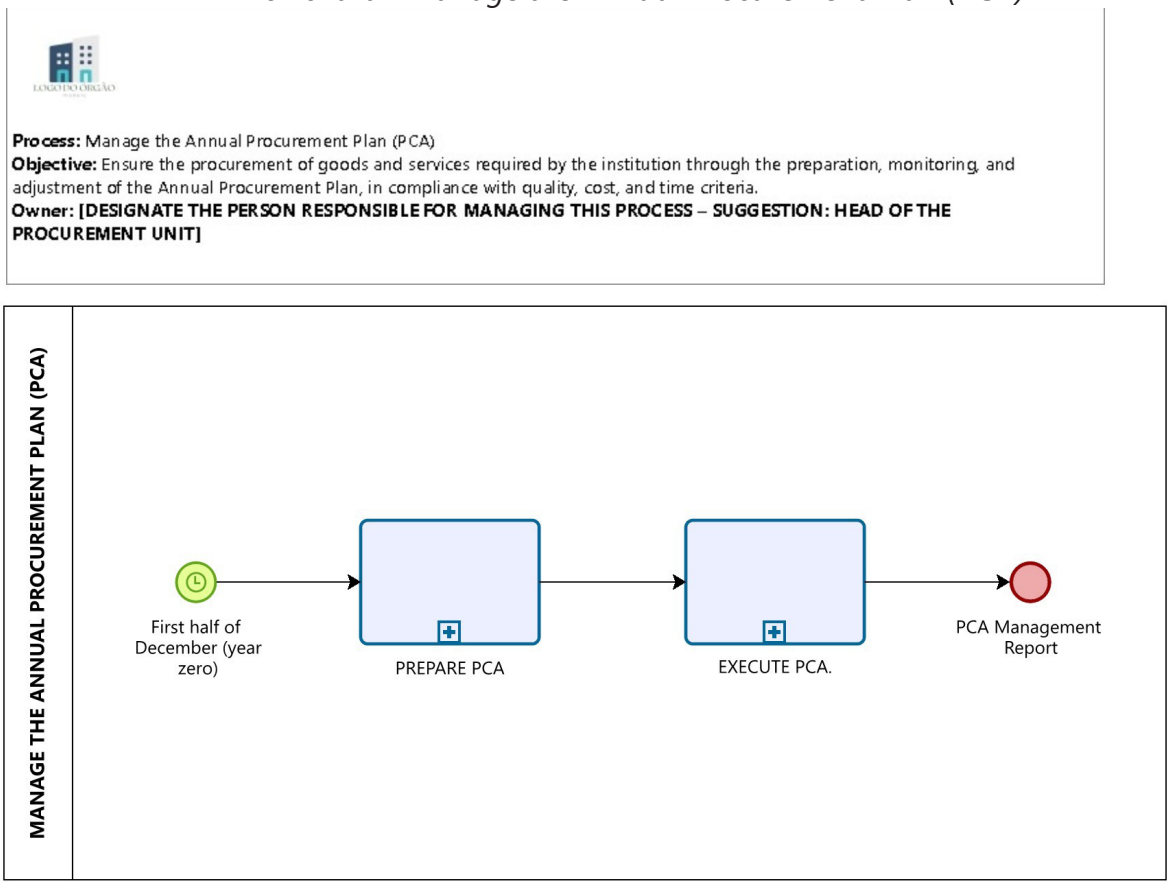
Section dedicated to the Annual Procurement Plan (PCA) and Standard Operating Procedures (SOPs), showing access to procedures, templates, and regulatory references (originally in Portuguese).

Source: Digital Guide PTT IFAP, internal version (2025), unpublished.

"PCA management" is represented in BPMN notation, as shown in Figure 4. By clicking on one of the activities, the corresponding flowchart is displayed. The representation specifies inputs, outputs, and verification points for monitoring timelines and assigning responsibilities.

Figure 4

BPMN Flowchart – Manage the Annual Procurement Plan (PCA)



Source: Reproduced from the IFAP Digital Guide PTT, internal version (2025), unpublished.

The "Training" section provides supporting materials organized by phase and by learning pathway, as shown in Figure 5. The content guides day-to-day use and supports the institutional adoption of the guide, offering objective instructions aimed at the teams responsible for procedural structuring.

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

Figure 5

Training section of the digital guide, showing access to supporting materials organized by phase and learning pathway (originally in Portuguese).

Source: Digital Guide PTT IFAP, internal version 2025, unpublished. Available at: https://sites.google.com/view/fluxo-de-contracoes-publicas (accessed in 2025).

The "Legislation" section brings together summaries and links to regulatory instruments, indicating the applicable provisions by phase and their linkage to the published templates, as shown in Figure 6. This page concludes the consultation cycle, as it provides normative support for the application of the described procedures.

Figure 6

Legislation section of the digital guide, presenting summaries and links to key regulatory instruments (originally in Portuguese)

Source: Digital Guide PTT IFAP, internal version (2025), unpublished. Available at: https://sites.google.com/view/fluxo-de-contracoes-publicas (accessed in 2025).

The guide is available at https://sites.google.com/view/fluxo-de-contracoes-publicas. The platform provides access to flows, templates, and regulatory instruments, with navigation organized by phase. The environment is publicly accessible and can be consulted via computer, tablet, or smartphone.

CONCLUSIONS AND TECHNOLOGICAL/SOCIAL CONTRIBUTION

The study was based on the analysis of IFAP's procurement processes and redesigned the process using a Business Process Management approach, in alignment with Law No. 14,133/2021 and institutional documentation. The proposal organized the planning stages, defined roles and responsibilities, and established verification points, resulting in the Digital Procurement Guide as a replicable technical product.

The modeling of the flows, the specification of expected outputs, and the linkage between tasks and documents strengthen input control. This approach addresses issues identified in the diagnostic, such as rework and information dispersion, and enhances traceability and the guidance of administrative activities.

The conclusions address the expected effects of adopting the guide. These include a reduction in returns, greater predictability of process flow, and faster access to guidance, considering the structure described in the Analysis section as a reference.

The methodology was based on documentary analysis and comparison with other institutions, without conducting interviews or focus groups. This delimitation restricts the direct interpretation of informal routines but does not compromise the usefulness of the proposal, which is grounded in administrative records and publicly available regulatory references.

The experience demonstrated that it is feasible to apply the Business Process Management (BPM) approach in the public sector, particularly in educational institutions. The integration of process modeling, document planning, and digital support offers an alternative to improve internal organization and the use of available resources.

It is recommended that the implementation of the guide be accompanied by a routine of monitoring and evaluation. This follow-up will enable future adjustments, the identification of new needs, and the continuity of the expected effects, such as predictability, control, and institutional organization.

The proposal brings together legal guidelines, administrative practices, and visual modeling. The designed structure can support other institutions in organizing their procurement flows and strengthening public management, promoting accessibility, standardization, and integrated documentation.

The study establishes conditions for the application of Business Process Management in public procurement within the context of federal educational institutions. External comparison supported analytical generalization, while formal verification ensured alignment between the redesign and the normative frameworks of the institution, the IPPC, and the Systems Department of the Federal Government's IT infrastructure (SISP) ICT process flow.

REFERENCES

Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. Qualitative Research Journal, 9(2), 27-40. Recuperado de: https://doi.org/10.3316/QRJ0902027

Brasil. (2019). Instrução Normativa n. 1, de 10 de janeiro de 2019. Plano Anual de Contratações e Sistema de Planejamento. Recuperado de: https://www.gov.br/compras/pt-br/acesso-a-informacao/legislacao/instrucoes-normativas-revogadas/instrucao-normativa-no-1-de-10-de-janeiro-de-2019-atualizada

Brasil. (2019). Portaria n. 13.623, de 10 de dezembro de 2019. Diretrizes para Unidades Administrativas de Serviços Gerais. Recuperado de: https://www.gov.br/compras/pt-br/acesso-a-informacao/legislacao/portarias/portaria-no-13-623-de-10-de-dezembro-de-2019

Brasil. (2019). Portaria n. 13.623, de 10 de dezembro de 2019. Diretrizes para Unidades Administrativas de Serviços Gerais. Recuperado de: https://www.gov.br/compras/pt-br/acesso-a-informacao/legislacao/portarias/portaria-no-13-623-de-10-de-dezembro-de-2019

Brasil. (2021). Lei n. 14.133, de 1º de abril de 2021. Dispõe sobre Licitações e Contratos Administrativos. Recuperado de: https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2021/lei/l14133.htm

Costa, R. L., Hollnagel, R. E. C., & Bueno, H. P. (2019). Compras governamentais: Panorama atual e desafios. Revista Científica Hermes. Recuperado de: https://www.redalyc.org/journal/4776/477658117003/html/

Creswell, J. W. (2012). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.). Pearson.

Cruz, E. C., Oliveira, T., & Gurgel, A. M. (2020). Desenvolvimento de um framework para o planejamento de compras públicas: estudo em uma universidade federal. Revista de Gestão e Projetos, 11(3), 94-116. Recuperado de https://doi.org/10.5585/gep.v11i3.18475

Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2018). Fundamentals of business process management (2nd ed.). Springer. Recuperado de: https://doi.org/10.1007/978-3-662-56509-4

Feliciano, F. M. H., & Verbicaro Soares, D. (2023). Alterações trazidas pela Lei n. 14.133/2021 (nova lei de licitações e contratos administrativos) ao ordenamento jurídico brasileiro. DI@LOGUS, 12(3), 69-98. Recuperado de: https://doi.org/10.33053/dialogus.v12i3.791

DOI: https://doi.org/10.14210/alcance.v33n1(jan/abr).p118-132

Fernandes, C. C. C. (2019). Compras públicas no Brasil: Tendências de inovação, avanços e dificuldades no período recente. Administração Pública e Gestão Social, 11. Recuperado de: https://www.redalyc.org/articulo.oa?id=351560525006

Gil, A. C. (2008). Como Elaborar Projetos De Pesquisa. São Paulo: Atlas.

Gil, A. C. (2022). Como elaborar projetos de pesquisa (7th ed.). Atlas.

Gulledge, T. R., & Sommer, R. A. (2002). Business process management: Public sector implications. Business Process Management Journal, 8(4), 364-376. Recuperado de: https://doi.org/10.1108/14637150210435017

Instituto Federal do Amapá. (2025). Guia digital. Recuperado de: https://sites.google.com/view/fluxo-de-contracoes-publicas

Instituto Federal do Amapá. (2025). Página institucional. Recuperado de: https://ifap.edu.br/

Janowski, T. (2015). Digital government evolution: From transformation to contextualization. Government Information Quarterly, 32(3), 221-236. Recuperado de: https://doi.org/10.1016/j.giq.2015.07.001

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. Educational Researcher, 33(7), 14-26. Recuperado de: https://doi.org/10.3102/0013189X033007014

Melo, A. A. de. (2018). Compras públicas sustentáveis: uma análise do desempenho da Advocacia-Geral da União no contexto da administração pública federal [Dissertação de mestrado, Universidade Federal de Santa Maria]. Repositório da UFSM. Recuperado de: https://repositorio.ufsm.br/handle/1/15209

Moreira, A. O., Brito, E. O., & Oliveira, P. S. (2023). Licitações e contratos: análise sobre a importância da nova Lei n. 14.133/2021: debates, perspectivas e desafios. Revista Contemporânea, 3(9), 13707-13726. Recuperado de: https://doi.org/10.56083/RCV3N9-015

Ribeiro, C. G., & Inacio, E. (2019). O mercado de compras governamentais brasileiro (2006-2017): Mensuração e análise. Instituto de Pesquisa Econômica Aplicada. Recuperado de: https://books.google.com.br/books?id=YtCozQEACAAJ

Schneider, S., & Schimitt, C. J. (1998). O uso do método comparativo nas ciências sociais. Cadernos de Sociologia, 9, 49-87.

Silva Junior, A. A. L., & Fernandes, T. A. (2023). Desmistificando a estruturação da governança das contratações públicas. Ronny Charle. Recuperado de: https://ronnycharles.com.br/desmistificando-a-estruturacao-da-governanca-das-contratacoes-publicas-uma-abordagem-juridico-administrativa-da-utilizacao-pratica-de-instrumentos-legais-e-de-gestao

Spendolini, M. J. (1993). Benchmarking. Makron Books.

Tribunal de Contas da União. (2023). Acórdão n. 2154/2023 – Plenário [Assunto: Acompanhamento da implementação da Lei n. 14.133/2021]. Recuperado de: https://pesquisa.apps.tcu.gov.br/doc/acordao-completo/2154/2023/Plen%C3%A1rio

World Bank. (2020). GovTech: The new frontier in digital government transformation (Equitable Growth, Finance & Institutions Notes; Governance). World Bank. Recuperado de: https://documents1.worldbank.org/curated/en/898571612344883836/pdf/GovTech-The-New-Frontier-in-Digital-Government-Transformation.pdf