Fast Track for Collaborative Solutions: A Methodology for Public Service Design Workshops Supported by LLMs

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Abstract. Context: Innovation and agility are critical needs in the public administration, driving the development of methodologies that optimize collaborative processes. **Goal**: This study focuses on co-creating a digital solution for a Service Plan of Functions through a Service Design Workshop. We propose and apply a fast track for collaborative Solutions approach, integrating large language models (LLMs) to streamline idea consolidation and facilitate consensus in service design workshops. **Method**: We conducted a workshop aimed at rethinking an existing solution from the perspective of the service user. This involved defining personas, mapping the user journey, proposing functionalities, and aligning these functionalities with the journey stages. **Results**: The proposed methodology significantly reduced execution time and enhanced the efficiency of service design processes involving large groups, without compromising decision quality. The study provides a detailed description of the methodology, the prompts employed, and the outcomes of a case study conducted in a Brazilian public-sector state-owned enterprise.

Keywords. Service Design, Public Administration, Large Language Models (LLMs), Collaborative Methodologies, User-Centered Design
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1. Introduction

The public administration is under increasing pressure to innovate and adapt to rapidly changing societal needs. Collaborative initiatives in this domain often face significant challenges, particularly when organizing ideas and reaching consensus in large, diverse groups. The complexity of these processes is further compounded by constraints on time, resources, and the need to address the interests of various stakeholders (Pajula et al., 2024; Venson et al., 2024). Collaborative decision-making in public administration frequently encounters obstacles such as fragmented communication and misaligned objectives, which can undermine the efficiency and effectiveness of innovation initiatives (**DBLP:journals/jucs/MarsicanoCPRF24**; Leonardi & Not, 2022). Similarly, (Not et al., 2024) highlighted that the growing complexity of public service design requires novel approaches to manage diverse perspectives and foster actionable outcomes.

Studies have identified several critical challenges in implementing co-production processes in public administration. Co-production is defined as a strategy that enables the production of public goods and services through the sharing of responsibilities and power among public agents, private entities, and citizens (Osborne

et al., 2021). There are two main types of co-production: 1) Simultaneous Co-production: This occurs when citizens actively participate during the delivery process of public services, directly collaborating in its execution; and 2) Sequential Co-production: This involves citizen participation in distinct stages of the production process, such as planning, implementation, or evaluation, but not necessarily during the direct delivery of the service. These types highlight different moments and forms of citizen engagement in the co-production of public services (Osborne et al., 2021). Among the key issues are the absence of clear theoretical frameworks to guide public managers, insufficient managerial skills, a lack of tools for effective implementation and capacity-building, and limited awareness among public managers about the concept of co-production (Figueiredo, Venson, et al., 2024), (Figueiredo et al., 2022). These challenges underscore the need for enhanced management education in this area (Pedrosa et al., 2022), (Sicilia et al., 2016). Additionally, other studies highlight that public administrations (PAs) often struggle to determine the starting point for initiating co-production efforts (Leonardi et al., 2023). They frequently lack structured approaches for managing work plans and documentation, face difficulties in overseeing tasks and handovers, and encounter challenges in sustaining processes that span months or even years. The inconsistent and unsystematic use of technology further exacerbates these issues. Public administrations often rely on a patchwork of devices and tools without a cohesive strategy, with inadequate planning for the regular and effective use of ICTs emerging as a significant challenge (Clifton et al., 2020).

Another issue is the lack of a consolidated guidelines of practices or institutional knowledge in co-production. Public administrations often need to reconfigure the process from scratch each time, as there are no established best practices or precedents to rely on (Leonardi & Not, 2022). (Leonardi & Not, 2022) also highlighted the pressing need for guidance in managing the numerosity and heterogeneity of stakeholders involved, as well as the evolving structure of collaborative networks. These challenges are compounded by bureaucratic and cross-organizational barriers that further hinder co-production efforts (Leonardi & Not, 2022). Support is also required to reduce the costs of user engagement and improve its effectiveness. Key strategies include creating collaboration settings that mitigate perceived power asymmetries between public officers and users, enabling continuous monitoring and iterative evaluation of the co-production process, and ensuring its accountability and sustainability. Together, these measures aim to foster a more structured and inclusive approach to co-production, addressing both operational and relational challenges within public administration (Loeffler, 2018).

Traditional methods for facilitating workshops in the public administration, while widely used, often fall short in addressing these challenges. Conventional workshop techniques can be time-intensive and struggle to accommodate the input of large, heterogeneous groups effectively. Furthermore, these methods may not provide the agility needed to rapidly adapt to emerging insights or unexpected constraints during the design process. This inefficiency is particularly problematic in scenarios where timely decision-making is critical (Belkacem et al., 2024). Recently, the Service Design (SD) approach has been used in the context of public services digitization to tackle some of these challenges. SD enables organizations to view their services from the perspective of citizens and those involved in delivering an innovative service (Figueiredo, Venson, et al., 2024; Trischler & Westman Trischler, 2022). It is a user-centered, collaborative, and holistic approach designed to create services that balance the needs of citizens with those of the organization, delivering seamless and high-quality experiences to improve existing services and develop new ones (Koskela-Huotari et al., 2021; Leinonen & Roto, 2023). To address these challenges, this study explores the potential of integrating large language models (LLMs) into collaborative design workshops in the public administration. LLMs, with their advanced natural language processing capabilities, have shown promise in consolidating ideas, generating insights, and facilitating consensus in various domains. However, their application in public administration contexts remains under-explored. This gap presents an opportunity to investigate how LLMs can enhance the efficiency and effectiveness of collaborative processes in this domain. The reliance on traditional methods for organizing and facilitating workshops in the public administration often hinders innovation, primarily due to their limited scalability and inefficiency in addressing the diverse inputs of participants. To overcome this challenge, this study aims to explore the following research question:

RQ.1. How can a "Fast Track for Collaborative Solutions" supported by LLMs optimize design workshops in public service?

We hypothesize that the integration of LLMs into workshop methodologies can accelerate the consolidation of ideas and facilitate consensus among participants, ultimately enhancing the outcomes of collaborative processes. This paper presents the following contributions: i) The development of specific prompts tailored for

the consolidation of ideas and the facilitation of consensus in collaborative workshops; ii) A methodology based on the concept of a "Fast Track for Collaborative Solutions," designed to enable agile and effective workshops, particularly in large and diverse groups; iii) The proposed approach is validated through a case study conducted in a Brazilian public-sector state-owned enterprise. By addressing a real-world challenge in the public administration, this study aims to provide a practical framework for improving service design processes, leveraging the capabilities of LLMs to overcome traditional workshop limitations.

2. Background and Related Work

(Stephen P Osborne & Strokosch, 2016) defined co-production as active or passive participation of public service users in activities such as the design, management, delivery, or evaluation of public services. Co-production of public services signifies that services are not solely delivered by professionals and managers from public agencies but are collaboratively created and subsequently provided to users and citizens (Brandsen & Honingh, 2016; Figueiredo, Pedrosa, et al., 2024). Additionally, (Scupola & Mergel, 2022) defined co-production as a collaborative process where multiple stakeholders (e.g., citizens, public and private organizations) work together to create public value during the digital transformation of public services. This process encompasses three main phases: 1) Co-design: Collaborative planning to address stakeholders' needs; 2) Co-development: Implementation phase where stakeholders jointly build the proposed solutions; and 3) Co-delivery: The cooperative delivery or execution of the developed solutions. This approach represents a more inclusive method for developing and delivering public goods and services, involving citizens, users, and public organization members in the entire process of creation, execution, and long-term sustainability (Sorrentino et al., 2018). Co-production highlights the role of users as active agents rather than passive beneficiaries. This alternative approach often results in better long-term outcomes. The growing interest in promoting more participatory service creation arises from the traditional challenges in delivering public goods and services. Moreover, user participation has been further driven by socio-economic crises and the challenges governments face, including increasing demand for public services, rising user expectations, and, in many cases, constrained government budgets for service provision (Bovaird & Löffler, 2013).

The distribution of power and responsibility between public and private actors can vary significantly, leading to different models of co-production. Stakeholders and users can assist the government in improving public performance and more effectively meeting the desires and needs of citizens. Additionally, the government can help citizens enhance their daily productivity, decision-making, and well-being by offering efficient and easily accessible public services (Linders, 2011). However, achieving this requires diverse collaborative processes, which can be facilitated and influenced by the introduction of ICT in various ways (Capolupo et al., 2020). According to (Not et al., 2024), co-production encompasses a wide range of practices and activities, including the use of Service Design approaches, co-design techniques (involving internal stakeholders, partners, and suppliers), and co-creation practices (with end users). These approaches may involve participants at varying levels of engagement, be applied at different stages of the creation process, and depend on the type of service, the activities, and the strategies and responsibilities involved. (Figueiredo, Venson, et al., 2024) employed a Service Design (SD) approach to foster innovation in public services through co-design and co-creation activities focused on citizen-centered solutions. The methodology was structured into four iterative phases: exploration, creation, reflection, and implementation. The authors applied SD to various government projects and concluded that using SD to co-design and implement public service solutions enhanced stakeholder engagement and contributed to service innovation. Additionally, the iterative practices of SD were found to lead to solutions more aligned with user and organizational needs, enabling the delivery of greater value to society.

Despite the benefits of co-production, it requires greater attention to governance and accountability, and relies on high levels of trust among the various parties involved to achieve successful outcomes (Not et al., 2024). To effectively implement co-production processes and impact traditional public policies and services, organizational structures must be developed with low centralization, high connectivity among actors, and an ethos of mutuality and equality among the different participants, including the end users. Therefore, co-production demands active citizen participation and a more engaged role from public organizations in service delivery (Not et al., 2024). The adoption and use of Artificial Intelligence (AI) technologies by the public administration have grown significantly. Governments have deployed AI systems for predictive policing, cybersecurity defense, regulatory enforcement, adjudicating benefits and privileges, and as chatbots to address citizen inquiries and assist with filling, searching, and drafting documents (Dunleavy & Margetts, 2023; Henman, 2020). With the rapidly increasing adoption of Generative AI (Gen AI) tools by the general public, governments have

begun experimenting with these technologies and issuing guidelines on how they could be used by public administration. Gen AI, in particular, presents opportunities for government organizations not only to enhance their interactions with citizens but also to integrate and leverage their internal knowledge assets to improve the development and delivery of public services (Dunleavy & Margetts, 2023).

AI can be leveraged to enhance government operations and services by designing systems and programs capable of solving problems, learning, perceiving, understanding, reasoning, and becoming aware of their environment (Mellouli et al., 2024). AI relies on identifying and processing data, selecting training datasets, choosing algorithms, conducting training, and evaluating outcomes. These data are often high-volume and pertain to diverse situations with varying complexity and contexts (Mellouli et al., 2024). Among these contexts, public administration stands out as a domain where AI can be applied across various sectors, including health, education, sustainable development, transportation, and the like. AI has emerged as a critical strategic element in government agendas. As public administrations strive to harness the power of AI to better serve their citizens, new opportunities for innovation and efficiency in public administration are arising. AI holds the potential to transform public services and policies, offering innovative capabilities that empower civil servants with enhanced support for decision-making processes (Mellouli et al., 2024; B. W. Wirtz & Müller, 2019). AI acts as a catalyst for creating innovative services for citizens, governments, and public organizations. By adopting AI, governments can unlock substantial benefits, such as improved service quality, increased productivity, and cost-effective service excellence (J. Wirtz, 2020). In this context, this research presents the integration of LLM tools into the design of a workshop aimed at facilitating the rapid collection and synthesis of ideas, agile consensus-building, and the generation of instant feedback and documentation to prototype the improvement of a public service.

3. Research Design

The methodology for this study was designed to evaluate the effectiveness of a fast track for collaborative solutions approach supported by LLMs in a service design workshop for the public administration. This section details the planning, execution, and tools used in the workshop, structured to facilitate rapid idea consolidation, agile consensus-building, and the prototyping of solutions. The agenda incorporated the following stages: 1. Workshop Context; 2. Integration of LLMs; 3) Deliverables; and 4) Evaluation. **1. Workshop Context** The workshop aimed to tackle inefficiencies in the submission and analysis of public service plans, focusing on co-creating a digital solution to optimize these processes. Its primary objective was to redesign the service with an end-user perspective, improving both user satisfaction and organizational efficiency. A total of 28 participants from various roles and public organizations took part in the workshop. These participants included key stakeholders, such as public servants, managers, and technical staff, ensuring a diverse range of perspectives and expertise. The workshop spanned two days, with each session designed to progressively build toward a minimum viable product (MVP) for the proposed service. The Workshop Context stage encompassed the following:

1. Introduction and Contextualization: Participants were introduced to the objectives of the workshop and the processes under analysis. Ice-breaking activities were conducted to foster a collaborative atmosphere, followed by a shared understanding of the existing challenges. The workshop aimed to co-create a digital solution based on the service design approach for the Functions Plan process. #P3 presented the process flow: a) Proposal/Amendment/Reconsideration/Start Process: The process begins when the state-owned company submits a proposal, a plan amendment, or a request for reconsideration; b) Insert Proposal Type: There are four types of analyses: a new functions plan proposal, a functions plan amendment, a request for reconsideration, and proposals with conditions; c) Insert Documentation: The state-owned company must gather all necessary documentation to support the analysis; d) Forward Proposal to Supervisory Ministry: The proposal is sent to the Supervisory Ministry, which verifies compliance with the company's policy and business guidelines; e) Receive Proposal: The proposal is received by Secretariat of Coordination and Governance of State-Owned Enterprises (SEST) (Canedo et al., 2021) to begin the technical analysis; f) Review and Forward to SEST: The proposal is forwarded to SEST for a more detailed analysis; g) Verify Complete Documentation: The first phase of SEST's analysis involves checking the completeness of the documentation; h) Request Additional Information or Proceed: If any documents are missing, SEST requests additional information; i) Merit Analysis: Once the documentation is complete, SEST conducts a merit analysis of the proposal, which involves comparing data and identifying necessary adjustments; j) Review of the

Technical Report Draft: After the analysis, a draft technical report is prepared and reviewed; k) Consolidation/Signature of the Technical Report: The final technical report is consolidated and signed; l) Send Feedback to the Company: After being signed, the technical report is sent to the company along with an official communication; m) Deadline for Compliance with Conditions: If the analysis imposes conditions, the company is given a deadline to comply with them; and n) Conclude Process: The process can be concluded when the company fulfills the conditions. If the deadline passes without compliance, the process is closed without fulfillment.

2. Problem Identification and Consolidation: Participants worked in groups to brainstorm issues related to the current process, using tools such as post-its for idea collection. These ideas were then consolidated into a unified problem statement during a plenary discussion.
   The primary focus of the workshop was the analysis of function plans by SEST, addressing the need to adapt to frequent changes in the dynamic structures of the process workflow. The majority of the workload is related to new plans or modifications to existing ones, while job and salary processes occur less frequently but are more complex. One of the key challenges is ensuring the speed of the process, which involves three main stakeholders: the state-owned enterprise, the analyzing body (such as the speaker's coordination team), and the supervising Ministry.
   #P3 detailed the documentation stages and emphasized the importance of complying with legal standards. There are four types of processes: new function plan proposals, plan modifications, reconsideration requests, and proposals requiring conditional approval. SEST's initial task is to verify the completeness of the documentation. If any documents are missing, the state-owned enterprise is notified to provide the missing items. Technical analysis is then conducted, with the possibility of requesting additional information. At the end of the process, a technical report is prepared and reviewed internally by SEST before being sent to the enterprise. This report may include conditions that the enterprise must fulfill within a stipulated timeframe.
3. Solution Exploration: Through the "Is-Is Not / Does-Does Not" framework, participants explored the characteristics and functionalities of the ideal solution. Group discussions were followed by collective consolidation of the insights.
4. User-Centered Redesign: Using design thinking principles (de Sá Araújo et al., 2019), participants defined personas (Canedo et al., 2023) representing typical users of the service, such as "Luci," a 45-year-old HR manager. Then, they mapped user journeys, identifying pain points and opportunities for improvement.
5. Journey-Based Functionality Design: Functionalities were proposed and aligned with specific stages of the user journey. This phase emphasized prioritization and feasibility, ensuring alignment with user needs and organizational goals.
6. Prototype Development: Low-fidelity prototyping methods, such as storyboards and wireframes, were employed to visualize the proposed solution. Groups collaborated to create initial designs, which were then unified into a final prototype.

2. Integration of LLMs. LLMs were used throughout the workshop to support: 1. Idea Consolidation: Synthesizing inputs from participants to create cohesive problem statements and solutions. At this stage, participants simultaneously shared their contributions through a platform integrated with the LLM. An example of the prompt used: "Group and synthesize ideas on [topic X] submitted by multiple participants, identifying key patterns and main themes." Outcome: A consolidated overview of the primary suggestions; 2. Consensus Facilitation: Summarizing group discussions to streamline decision-making processes. The LLM organized the grouped ideas into clear options for voting or discussion. An example of the prompt used: "Generate three options based on the main ideas, considering different perspectives, to facilitate group decision-making." Outcome: Concrete and structured proposals for decision-making; and 3. Feedback and Documentation: Generating instant summaries of each session, ensuring comprehensive records of insights and decisions. Real-time automated summaries of the discussions and decisions were generated. An example of the prompt used: "Create a detailed summary of the decisions made and the corresponding justifications provided by stakeholders during this session." Outcome: Comprehensive reports of the discussions and decisions finalized at the end of the workshop.

3. Deliverables. The workshop concluded with the development of an MVP (and its prototypes), outlined by a value proposition, user personas, key functionalities, and expected outcomes. This provided a tangible output for stakeholders to further refine and implement. **4. Evaluation**. The methodology was evaluated based on participant feedback, the quality of the MVP, and the efficiency of the workshop process. Metrics included the time required for each stage, the perceived effectiveness of LLM integration, and the alignment of the final prototype with user and organizational needs.

The service design workshop conducted with Startup EstataisGov provided significant insights and actionable outcomes aimed at enhancing the management and submission of public service plans. Held over two days, the workshop facilitated collaborative discussions among key stakeholders, including representatives from public enterprises, supervisory ministries, and SEST. The following section detail the main results achieved, categorized into problem identification, user journey development, functional prototyping, and recommendations for technological and procedural improvements.

4. Results

The central focus of the workshop was to systematically identify and categorize the challenges in the current system for public service plan management. Participants used tools such as post-its and facilitated group discussions to map the primary pain points, which were later consolidated into categories. During **the introduction and contextualization phase**, participants were divided into small groups to gain insights into the problem. After their discussions, they recorded their ideas about the issue on post-it notes. The participants generated 48 insights related to the problem (Function Plan), as summarized in Table 1. During the problem identification and consolidation phase, these insights were processed using a Large Language Model (LLM). The text submitted to the LLM was:

"With a specialized perspective on Service Design, analyze the texts presented in the post-its (1) and organize them into commonly practiced categories. If you cannot identify a word with more than 90% accuracy, ask me".

In response, the LLM reported successfully analyzing the content and organizing it into categories. Some words or phrases were flagged as open for further clarification regarding their categorization. Overall, the accuracy level was high, as the categories identified by the LLM aligned closely with the responses provided by stakeholders. In addition to categorizing the insights, the LLM offered context for its decisions and highlighted the significance of each problem raised. A subsequent prompt was used to consolidate the information into seven primary problem categories. This allowed the data to be reduced without compromising quality, enabling quicker comparison with the participants' feedback. With the LLM's assistance and validation by participants, the following problem categories were established: 1. Function Plans of Companies; 2. Improvement of SEST Services;3. Processes and Analyses; 4. Challenges and Limitations; 5. Innovations and Tools; 6. Business Needs and Sustainability; and 7. Agility and Optimization. Moreover, leveraging the LLM's suggestions and further validation from participants, the core problem was defined as follows:

"The process of submitting and analyzing the function plan faces challenges related to the lack of agility, standardization, adequate information, and functionalities."

Tab. 1 – Insights for the Functions Plan

ID	Insight
1	High demand volume: The process faces a large volume of requests.
2	Complex analysis: High quantity of documents requiring thorough review.
3	Merit analysis: Evaluation of the request's intrinsic merit.
4	Document analysis: Reviewing and validating submitted documents.
5	Order-based merit review: SEST technical merit analysis is conducted in the order of submission.
6	Document verification and checklist: Documents submitted by the supervising ministry are analyzed and checked.
7	Service automation: Automate the functions plan workflow to enhance user experiences for SEST, ministries, and state-owned enterprises.
8	Communication with supervisory authorities: Ensure effective communication within and outside the system.
9	Comparative analysis: Compare approved and proposed functions plans within the same state-owned enterprise and across others.
10	Initial submission: The process begins at the state-owned enterprise, which provides documents for analysis.

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ID	Insight
11	Process agility: Accelerate the overall process to improve efficiency.
12	Guidelines and business context: Establish clear directives and align with organizational goals.
13	Technical note drafting: Prepare a technical note for review by coordinators and directors before approval by the secretariat.
14	Non-implementation of functions plan: Address instances where the enterprise fails to implement the plan.
15	Limited team: Small team available to handle the analyses.
16	Report generation: Extract reports of approved functions plans.
17	Document iteration: Revisions and resubmissions consume significant time.
18	System forms: Leverage system-based forms for data collection.
19	Procedural standardization: Establish a systematic approach to the process.
20	Legal basis review: Ensure the request adheres to legal requirements.
21	Largest requests: Prioritize significant or complex cases appropriately.
22	Improved SEST services: Enhance SEST's functions plan services for state-owned enterprises.
23	Proposal withdrawal or substitution: Determine whether ministries or enterprises can withdraw or replace proposals.
24	Modernization and simplification: Update and simplify regulatory frameworks.
25	Business needs: Address specific organizational requirements.
26	New functions plan proposals: Process new plan submissions effectively.
27	Final deliverable: Issue the technical note or official document to the state-owned enterprise.
28	Merit evaluation criteria: Define what aspects are considered in the merit analysis.
29	Reconsideration requests: Allow enterprises to submit reconsideration requests with SEST's response.
30	Functions plan scope: Evaluate and refine the functions plans of state-owned enterprises.
31	Process tracking: Enable access to the status of SEST processes.
32	Limited technical resources: Few technicians available to conduct analyses.
33	SEST role justification: Clarify why enterprises must undergo SEST's review process.
34	Information quality: Ensure accurate and comprehensive information is submitted.
35	Conditional responses: Provide responses with conditions, setting deadlines for the enterprise's reply to SEST.
36	Scope and approach review: Revise the scope and operational mode to align with goals for state-owned enterprises.
37	Alignment reviews: Use alignment sessions to complement information and enhance understanding.
38	Email communication challenges: Question the necessity of involving the supervising ministry when email suffices for enterprise communication.
39	Streamlining the process: Explore ways to make the process faster and more efficient.
40	Fast-track options: Consider "FAST-TRACK" workflows for groups of enterprises with similar characteristics.
41	Request complexity levels: Address the challenge of diverse complexity levels competing in the same workflow.
42	Risk supervision: Incorporate risk oversight mechanisms (e.g., Previc).
43	Financial sustainability: Ensure that plans are financially sustainable.
44	Participation scope: Clarify if all enterprises are required to submit these requests.
45	Transparency: Improve transparency by providing access to SEST's decisions and publishing timelines in official directives.
46	AI utilization: Implement AI tools to support analyses and decision-making.

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ID	Insight
47	Excel and historical data: Use Excel spreadsheets to compare current requests with past proposals.
48	Enterprise versatility: Adapt to the unique characteristics of different enterprises.

In **the solution exploration phase**, after group discussions, participants identified the following critical points/contradictions: a) Compliance vs. User Guidance; b) Intelligent Automation vs. Analyst Replacement; c) Access Control vs. Transparency; d) Detailed Reporting vs. Merit Analysis; e) Process Standardization vs. Necessary Customization; and f) AI Usage for Analysis vs. Norm Review. Table 2 presents the results from applying the "Does" and "Does Not Do" technique. We asked the LLM to create a persona and a user journey representing an average Brazilian individual who uses the services presented during the workshop, focusing on the following information: Name, Age, Questions, Tasks, Feelings, Motivations, and Objectives. The LLM generated a persona that could potentially be used in the development of the workshop. However, the information was not directly presented to the group of participants. Instead, it was compared with the personas created by the participants themselves. During this comparison, some differences were identified, particularly concerning the "pain points" highlighted by more experienced stakeholders. Nevertheless, the prompt proved effective and has potential for improvements in future applications. To enhance the process, future iterations of the prompt should focus on prioritizing the "pain points" and "critical demands" raised by the participants, while maintaining the necessary randomness and divergence for problem exploration.

Tab. 2 – Solution Exploration with the Does and Does Not Do Technique

Does	Description
Receives and Categorizes Requests	Receives and categorizes user requests and processes.
Generates Reports	Provides detailed reports on the status and progress of requests.
Compliance	Assists in meeting norms and regulations.
User Guidance	Provides automated instructions and help to facilitate usage.
Uses AI for Analysis	Analyzes data using artificial intelligence, improving accuracy and efficiency.
Access Control and Security	Manages who can access specific information and functionalities.
Generates Indicators	Provides insights and performance metrics for users and managers.
Standardizes Requests	Defines a standardized workflow for handling different types of requests.
Intelligent Automation for UX	Automates processes to ensure a better user experience.
Communication and Integration	Serves as a bridge to connect information between systems and teams.
Provides Templates	Facilitates the creation and management of standardized documents.
Does Not Do	**Description**
Norms Review	Does not review or modify legal or regulatory norms.
Merit Analysis	Does not decide on the merit of issues; it only organizes the data.
Analyst Replacement	Does not replace human expertise or analysts' decisions.
Replicate Processes	Does not replicate processes without adaptations; it organizes but requires customization.
Generate Work	Does not create work automatically; it only manages and optimizes existing processes.

In **the User-Centered Redesign phase**, participants contributed to creating the persona profile. During the creation process, the workshop moderator facilitated discussions within each group, addressing their questions and providing any necessary information. Each group presented their persona's profile, including behavior and habits, pain points and frustrations, as well as needs and goals. Figure 1 illustrates the persona proposed by Group 1. We kept the image in Portuguese to preserve the authenticity and reliability of the content created during the workshop. The final persona profile was developed after extensive discussions and

comparisons of the proposals presented by all groups. The consolidated persona profile is detailed in Table 3. The first day of the workshop concluded with the definition of the persona's profile and behavior.

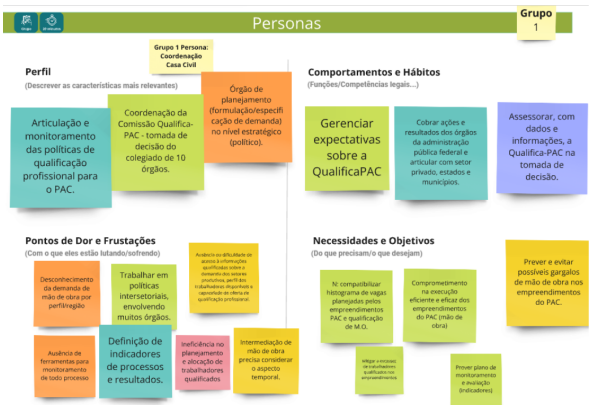

Fig. 1 – Persona Construction

Tab. 3 – Persona Profile/Behavior

Profile	Behaviors	Pain Points and Frustrations	Needs and Goals
SEST Analyst	Adds requested information, Analyzes personal files, Maintains financial health, Makes automated decisions.	Lack of understanding of requests, Incorrect demands, Distrust, Work overload.	More data and inputs, Clearer requests, Simplified communication with the company.
State-Owned Enterprise Career Analyst	Enjoys talking and discussing ideas, Promotes solutions, Open to change, Motivated by challenges.	Issues with expenses, Lack of subsidies, Conflicts of interest, Union pressures.	Autonomy in HR management, Quick information, Agility in proposal creation.
HR Manager (People Management)	Liaises with top management and SEST, Negotiates with unions.	Lack of understanding of SEST's demands, Slow analysis process.	Clear guidance, Agility, Fewer barriers in the process.
HR Competence Unit	Sense of urgency.	Delayed responses, Lack of guidance, Communication difficulties.	Faster responses, Greater autonomy, Easy-to-use and guiding system.
Public Enterprise	10,000 employees, Treasury-dependent, Aviation sector: Renewable energy production, Medium-sized company, Activation zone, Average budget.	Promotes renewable energy projects across the country, Oversees project implementation and execution, Manages federal funds allocated for its activities, Supports sustainable development in Brazil.	Lack of autonomy for independent work, Difficulty obtaining market benchmarks, Challenges filling specific roles, Incompatibility between public administration response times and market dynamics, Lack of understanding of technological evolution by SEST.

The second day of the workshop began with the definition of user journeys (**Phase: Journey-Based Functionality Design**. A total of four journeys were created: 1) Management of Job Plans; 2) Request for a New Plan; 3) Login and Plan Management via Gov.br; and 4) Process of Transfers and Plan Execution. This generic user journey integrates the main steps outlined in the four specific journeys, organizing the flow cohesively: Access and Login; Classification and Completion of the Request; Submission and Validation; Monitoring and Alerts; Completion and Notification; and Process Finalization with Accountability. It adheres to the primary

Tab. 4 – Generic User Journey

Step	Description
1. Access the System	The user accesses the system based on their profile (e.g., Gov.br system or the company's corporate system). They log in and select the type of request to be made (e.g., job plan, workload, remunerations, etc.).
2. Define the Request	The user classifies the request: it can be a new plan, an amendment to an existing plan, a reconsideration of a decision, or compliance with specific conditions. The system provides the option to consult a checklist or tailored instructions for each type of request.
3. Fill Out and Submit the Request	The user completes a smart template provided by the system, including clauses related to the request, such as: i) Remuneration value; ii) Specific assignments (e.g., FG, workloads); iii) Access requirements for the role; iv) Workload estimation; and v) General/thematic justification for the request. The system allows the inclusion of attachments and document validation before submission. After completing the template, the user submits the request, generating a protocol.
4. Validate and Forward the Request	The system performs automatic document validation. The request goes through internal reviews (e.g., legal, councils, IT, etc., as necessary). The user can forward the request to the supervising ministry or another competent authority, including a technical opinion, if applicable.
5. Monitor the Request	The user can check the real-time status of the request, accessing all company submissions via a dashboard. The system generates automatic alerts about deadlines, updates, or the need for additional adjustments. The user has access to the history of completed analyses and can track pending and new requests.
6. Conclude the Request and Notify the Supervising Ministry	The request is automatically finalized in the system, and the final document is made available to the user. The system automatically notifies the supervising ministry or competent authority of the decision regarding the request. If applicable, payment guides (e.g., GRU) or other types of documentation are generated.
7. Close the Process	The process is concluded with the implementation of the plan or the accountability procedure. The system records all stages, ensuring transparency and traceability. Control bodies can access the data to monitor and oversee the execution of planned actions.

stages, such as request classification, template completion, and document submission, enabling the execution of each type of plan or function within the system.

The Prototype Development phase was conducted using storyboards, which allow illustrating user interaction with the service. Each group created their wireframes using flip-charts, post-its and colored pens. Afterwards, all groups presented their results and collaborated to define the final unified version of the prototype. Afterwards, the solution screens were designed by design professionals, using the Figma tool. In **the Deliverables phase**, the MVP was developed, including the following elements: 1. Value Proposition: A concise description of the value the MVP will provide to users, focusing on the primary pain point or need it will address; 2. Personas: Identifies and describes the main user profiles of the MVP, including relevant characteristics, needs, and behaviors; 3. Journeys: Outlines the key steps a user will take when interacting with the MVP, focusing on the most critical interactions to deliver value; 4. Features: Lists the essential features the MVP must have, prioritizing only what is necessary to validate the main hypothesis; 5. Expected Outcomes (Prototypes): Describes the results expected from the MVP, including both business and user outcomes; 6. Metrics: Defines the key metrics that will be used to measure the success of the MVP, ensuring they align with the expected outcomes; 7. Cost and Timeline: Estimates the total cost to develop and launch the MVP, creating a high-level timeline with key stages and deadlines; and 8 Delivery Date: Sets a clear delivery date for the MVP, helping to maintain focus and prevent scope creep.

These components serve as the foundation for developing the MVP, ensuring a focused, result-driven approach that allows for quick adjustments as needed. In **the Evaluation phase**, the methodology was assessed through participant feedback, the quality of the MVP, and the overall efficiency of the workshop process. The evaluation

focused on metrics such as the time spent on each stage, the effectiveness of integrating LLMs, and how well the final prototype aligned with user and organizational needs. This feedback provided valuable insights for refining the methodology and improving future workshops.

The results of the Service Design workshop, Startup EstataisGov, provided an overview of the management and submission process for job plans in state-owned enterprises. It highlighted the main process stages and the challenges faced by public servants in these organizations. The proposed solution was developed through participant insights, presentations, and prototyping activities. The narrative focused on enhancing efficiency, transparency, and innovation in addressing the activities and challenges of the job plan process. Over the two-day workshop, several critical areas for improvement were identified, particularly the lack of standardization and speed in handling requests, as well as the need for more effective communication between state-owned enterprises and SEST. Workflow analysis emphasized how automating certain process steps could reduce response times while ensuring a better user experience. The use of generative AI across all stages helped improve the quality of analyses and discussions, ensuring responses were faster and more accurate. Thus, the outcomes achieved during the workshop were highly positive, providing a clear roadmap of current issues and challenges, as well as practical and innovative solutions. The focus on digital solutions, standardization, user experience, and the adoption of new technologies aims to create a significant positive impact on the efficiency and transparency of the job plan management process in state-owned enterprises. These results paved the way for a more agile, integrated, and effective system, capable of meeting the demands of state-owned enterprises and supervising ministries while ensuring compliance with current regulations and accelerating processes.

RQ.1 Summary: A fast track for collaborative solutions supported by Large Language Models (LLMs) can optimize design workshops in public service by automating repetitive tasks, such as data categorization and summarization, enhancing real-time collaboration, and providing instant access to relevant information. LLMs can facilitate idea generation and decision-making by analyzing vast amounts of textual data and identifying key patterns. This reduces time spent on manual processing, allowing participants to focus on high-value activities. Moreover, the integration of LLMs can improve communication and alignment between stakeholders by ensuring consistency and clarity in the shared content.

5. Discussions

This section highlights several critical challenges identified within public service workflows, including process inefficiencies, high demand and limited resources, inadequate communication, and lack of transparency. These challenges are not exclusive to this study but are consistent with those reported in other research on public sector operations. **Process Inefficiencies**: The workflow for analyzing public service plans is hindered by bureaucratic delays, lack of standardized templates, and high variability in submission quality. Participants highlighted the prolonged timelines required for document verification, merit analysis, and internal reviews. Other studies have similarly highlighted inefficiencies in governmental decision-making processes, often attributed to bureaucratic complexities (Eom & Lee, 2022; Harfianto et al., 2022).

High Demand and Limited Resources: SEST faces an overwhelming volume of requests with a limited number of technical analysts. This imbalance often results in delays and bottlenecks, especially for complex submissions. (Daßler et al., 2024) conducted 17 expert interviews to investigate the co-production process, the measures utilized, and the challenges faced. Four key challenges were identified: recruiting citizens, managing resources, navigating political hurdles, and fostering cooperation between administration and citizens. The study also highlighted that financial constraints are a common issue in collaborative projects involving citizens, with personnel shortages presenting a significant challenge. The authors emphasize the importance of adequate budgets and professional facilitation to ensure the sustainability of projects and their efficient implementation by public agencies. **Inadequate Communication**: Communication gaps between public enterprises, supervisory ministries, and SEST were noted as a major issue. Misaligned expectations and unclear guidelines exacerbate these challenges. This finding aligns with other studies in the literature (**DBLP:journals/jucs/MarsicanoCPRF24**; Androniceanu, 2021; Canedo et al., 2021; Criado & Villodre, 2022; Daßler et al., 2024; Figueiredo, Venson, et al., 2024; Venson et al., 2024), which also highlight challenges stemming from communication difficulties, particularly in maintaining consistent citizen engagement, managing diverse stakeholder interests, and aligning differing schedules.

Lack of Transparency: Stakeholders identified the need for greater visibility into the status of submissions and decisions, emphasizing that a transparent process would build trust and accountability. (Androniceanu, 2021) investigated the level of transparency in Romanian government ministries by analyzing public data and information available on the websites of 18 ministries and conducting online surveys with 45 employees from the ministries' Information and Documentation Departments. The authors concluded that administrative transparency remains a challenge for Romanian government ministries. They emphasized that access to information builds citizen trust in public agencies, enables citizens to understand government decisions, and increases their confidence and satisfaction in using public services offered by the government. This finding reinforces the results of our research. Despite identifying some challenges during the public service design workshops supported by LLMs, several key advantages were observed: **1) Time Reduction**: The implementation of the Fast Track reduced the duration of workshops by at least 30%; **2) Improved Collaboration**: Enhanced participant engagement driven by the agility and clarity of the process; and **3) More Informed Decisions**: The effective consolidation of ideas resulted in stronger and more robust proposals. The facilitation of the workshop enabled greater efficiency in handling large volumes of information and reduced fatigue during extended collaborative processes, given that the processes analyzed by SEST are complex and require the involvement of various stakeholders. However, the reliance on certain tools and the need for adequate infrastructure to conduct the workshop, as well as challenges in participants' initial adaptation to the tools used, may impose limitations on the use of the fast track for collaborative solutions. Despite these limitations, the proposed methodology for conducting workshops has the potential to transform the way workshops with Brazilian federal public administration agencies are conducted in the public sector, fostering agile and collaborative decision-making among all participants. Furthermore, the fast track can be adapted to any public service in different countries.

6. Threats to Validity

In this study, several potential threats to validity have been identified, which may influence the reliability and generalizability of the results. Following the framework of Wohlin et al. (2012), these threats can be categorized into internal, construct, external, and conclusion validity. **Internal validity** refers to the extent to which the study can establish causal relationships between the interventions (for instance, the use of AI and automation) and the outcomes (for example, efficiency improvements, decision quality). A potential threat to internal validity could be the presence of uncontrolled variables, such as external organizational changes or variations in the level of experience of the participants (for instance, technicians and managers). Additionally, biases in the selection of participants or sample sizes could influence the observed outcomes. Efforts were made to mitigate this threat by involving a diverse set of participants from various roles within the public sector companies, ensuring a broader understanding of the system's impact.

Construct validity concerns whether the measures used in the study truly represent the concepts they are intended to measure. In this study, the main constructs include process efficiency, decision quality, and user satisfaction. A potential threat is the use of subjective assessments (for instance, user feedback) to evaluate these constructs, as different participants may interpret or report their experiences differently. To mitigate this, multiple sources of data were used, including surveys, interviews, and system logs, which helped triangulate the findings and reduce the bias associated with any single source. **External validity** concerns the generalizability of the findings beyond the specific context of the study. One potential threat is that the results may not be applicable to all public sector agencies or to other governmental systems that do not use similar technologies. The study was conducted in a specific setting (state-owned companies and focused on a particular process: Function Plan). As such, caution must be exercised when generalizing the findings to other contexts. Future studies in different sectors or with larger sample sizes could help improve external validity and expand the generalizability of the results. **Conclusion validity** concerns the degree to which the conclusions drawn from the study are accurate and reliable. A possible threat to conclusion validity is the improper use of analysis, which could lead to false positive or negative results. To address this, appropriate methods were applied to analyze the data, ensuring that the results were statistically significant and reflective of the true impact of AI and automation. However, limitations in the sample size and study duration could still affect the robustness of the conclusions. Future research should focus on expanding the scope of this study, potentially involving a larger and more diverse set of public sector organizations, as well as incorporating longitudinal data to assess the long-term effects of AI and automation on process efficiency, decision quality, and user satisfaction. Additionally, further studies could explore the impact of different AI models and automation technologies on the outcomes of the process, ensuring the reliability and robustness of the findings across different contexts.

7. Conclusions

The workshop outcomes provided valuable insights into the existing challenges and opportunities for improving the management of job plans in state-owned enterprises and the SEST. The comprehensive mapping of problems revealed key issues such as delays in the analysis process, lack of standardization in documentation, and complex workflows, all of which were hindering the efficiency of the system. These findings formed the foundation for proposing practical solutions to streamline and optimize the entire process. The development of user journeys provided a deeper understanding of the different user interactions with the system. By mapping out the steps for various types of demands—such as new plans, modifications, reconsiderations, and compliance requests—participants were able to identify critical touchpoints that require optimization for improved user experience and efficiency.

Prototyping and refining system functionalities were crucial to visualizing the potential improvements, such as the use of intelligent templates, workflow automation, and automated report generation. These prototypes not only allowed for the testing and validation of ideas but also laid out a clearer path for future system implementation. The consensus around integrating advanced technologies, particularly automation and AI, was a pivotal outcome. Participants identified that automating document analysis and demand tracking could significantly reduce the time required for merit evaluations, enabling SEST technicians to focus on more complex tasks. This would also improve the accuracy and consistency of the analysis process, minimizing errors and rework. Standardization emerged as a central theme, aiming to unify demand management with clear workflows and standardized models. This approach is intended to simplify tasks for both technical staff and managers, while enhancing transparency throughout the process. It would also create a more predictable workflow, allowing for better expectations management for both state-owned enterprises and supervising ministries. Furthermore, the focus on improving user experience (UX) underscored the importance of creating an intuitive, accessible, and adaptable system that caters to the diverse needs of different user profiles. This not only involves system interface design but also emphasizes real-time communication and information sharing between all parties involved.

Several innovative ideas and simplifications were proposed, including the creation of a FAST-TRACK for less complex demands and the modernization of the regulations governing job plan processes. Simplifying workflows and granting greater autonomy to state-owned enterprises were seen as necessary measures to address the growing volume of demands. These innovations align with the need to ensure the sustainability of the process and its compliance with government policies and business directives. In conclusion, the workshop successfully provided a roadmap for creating a more efficient, transparent, and user-centered system for managing job plans in state-owned enterprises. The integration of technology, standardization, and user-focused solutions offers a promising path toward improving process efficiency and ensuring compliance with regulatory requirements. Considering the fundamental role of artificial intelligence and automation in improving the organizational efficiency of public sector companies, a future study should focus on evaluating the real impact of generative AI. This should not only include the operational efficiency of processes but also assess the impact on the quality of decisions made by technicians and managers in state-owned companies. Furthermore, it is important to evaluate the accuracy of automated analyses and how this affects the satisfaction and trust of users in government systems.

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