Business Process Improvements in Hierarchical Organizations: A Case Study Focusing on Collaboration and Creativity

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Abstract: This paper describes a case study of business process improvement (BPI) in a large and hierarchical organization in the public sector. Business Process Management (BPM) is crucial in the inevitable digital transformation of large organizations, streamlining workflows and enhancing efficiency. It involves systematic design, execution, and continuous improvement of processes, incorporating efficient activities and digital tools like automation and artificial intelligence. Despite the benefits, implementing BPM in highly hierarchical organizations poses challenges, including resistance to change and communication barriers. Thus, the paper advocates a collaborative and creative BPI approach to address these as a crucial stage of the BPM cycle. Collaboration is essential for breaking down silos and promoting a holistic BPM approach, while creativity facilitates transformative change in established norms. From several BPI methodologies available, we select and apply one called Boomerang in a collaborative workshop format. This methodology is based on a design thinking process and gamification strategy. A case study utilizing Boomerang demonstrates successful BPI by balancing established structures with innovative transformations. Still, lessons learned are identified, emphasizing the need for careful preparation of a collaborative workshop, stakeholders' selection, a kit of artifacts to support this event, and a trained group to conduct the BPI process.

1 INTRODUCTION

Business Process Management (BPM) plays a fundamental role in the digital transformation of large organizations, optimizing and streamlining their operational workflows (Pihir, 2019). At its core, BPM involves the systematic design, execution, monitoring, and continuous improvement of business processes to increase organizational efficiency and effectiveness (Brocke and Rosemann, 2015; Jeston and Nelis, 2006). In large and hierarchical organizations, easily found in the public sector, BPM can help identify outdated or inefficient processes and replace them with automated, technology-based solutions (Ghatari et al., 2014). This may involve integrating digital tools such as workflow automation, artificial intelligence, and data analytics to improve productivity and decision-making (Pihir, 2019). Moreover, BPM can promote collaboration between departments, eliminating silos and promoting a more cohesive approach to digitalization (Pernici and Weske, 2006; Rosemann, 2015). By continually monitoring and analysing processes, BPM allows organizations to identify areas for improvement, ensuring that digital initiatives are implemented and refined for continued success in the ever-evolving digital landscape. Therefore, BPM is a strategic driver that guides large organizations along their digital transformation journey, driving operational excellence and promoting a culture of continuous improvement (Ahmad & Van Looy, 2020).

Despite these opportunities and benefits, implementing BPM presents several challenges, especially in large, highly hierarchical organizations. Due to their complex structures and human-centric and knowledge-intensive business processes, a significant obstacle is resistance to change from stakeholders involved in a BPM project since hierarchical structures often establish entrenched processes and organizational culture (Ghatari et al., 2014). Convincing leaders to adopt BPM can be complex, as it can disrupt existing power dynamics and require a change in mentality that cannot always

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be achieved agilely (Looy, 2018). This complexity is even more evident in the public sector, where leadership positions are dynamic and periodic (Ghatari et al., 2014). Siled departments may resist sharing data, making creating integrated, streamlined processes challenging. Furthermore, decision-making processes can be slow and bureaucratic, preventing the agility that BPM aims to achieve. Thus, communication and collaboration barriers are prevalent in hierarchical organizations, hindering the continuous flow of information necessary for effective BPM (Ghatari et al., 2014).

These challenges require change management strategies, promoting a culture of openness to innovation, and ensuring clear communication channels (Looy, 2018). In this context, this article defends an approach that stimulates the collaboration and creativity of stakeholders involved in BPM projects of hierarchical organizations, focusing on the business process redesign and co-creation of the To-Be model, a critical stage in business process improvement (BPI) (Stojanović, 2016).

Collaboration and creativity are fundamental to business process improvement (BPI) in large, highly hierarchical organizations. In a context where rigid structures and silos often prevail, promoting collaboration is crucial to breaking down communication barriers and promoting a holistic approach to BPI, considering business and technology sectors (Attaran, 2003). Furthermore, cross-functional collaboration involving multiple sectors and perspectives leads to more comprehensive insights into existing processes and innovative solutions for improvement with a broad view of existing problems (Pernici and Weske, 2006). On the other hand, creativity plays a central role in identifying new approaches to streamline operations and increase efficiency. Creative problem-solving allows teams to think beyond traditional boundaries and envision new, more effective processes (Figl & Weber, 2012). Thus, in hierarchical organizations, where adherence to established norms is common, infusing creativity into BPI processes becomes a catalyst for transformative change.

Several strategies can be employed to promote collaboration and creativity within the BPI of these organizations (Rosemann, 2015). Leadership must actively encourage a culture of openness to ideas, recognizing and rewarding innovative thinking. Establishing cross-functional teams that bring together individuals from different departments promotes diverse perspectives (Cereja et al., 2018). Creating a safe space for employees to express ideas without fear of criticism encourages creative thinking (Brown, 2009). Additionally, implementing technology platforms for collaborative work and sharing ideas facilitates communication and engagement (Kock, 2005). By prioritizing these aspects, large hierarchical organizations can navigate the challenges of their structures and harness the full potential of their workforce for successful business process improvement.

This paper describes a case study that adopts a combination of these alternatives through the Boomerang Methodology defined in (Picanço & Santos, 2022). Based on collaborative techniques, design thinking methodology, and a gamification strategy, this method was adapted and used in a BPM Project of a large, highly hierarchical organization in the judicial sector. The results prove the effectiveness of this approach, showing that successful BPM in this kind of organization requires a careful balance between respecting established structures and driving the transformations necessary to unlock efficiency and innovation.

2 BPI METHODOLOGIES

Business Process Improvement (BPI) holds significant importance within the Business Process Management (BPM) cycle, contributing to enhanced efficiency, effectiveness, and overall organizational performance (Rashid & Ahmad, 2013; Smith, 2003; Jeston and Nelis, 2006). BPI involves identifying, analysing, and restructuring existing processes to optimize outcomes. Integrating BPI into the BPM cycle ensures a continuous and systematic approach to managing and refining business processes. Moreover, BPI fosters innovation and creativity. It encourages a culture of continuous improvement, empowering employees to contribute ideas for process enhancement. This adaptability is crucial in today's dynamic business environment, where continuous changes require organizations to be efficient and responsive.

BPI has two primary modalities (Stojanović, 2016): *process redesign* and *reengineering*. Process redesign involves making incremental changes to existing processes for optimization. In contrast, process reengineering is more radical, requiring fundamental restructuring to achieve significant improvements. Both modalities aim to improve operational performance to achieve substantial gains in efficiency and effectiveness. Considering large and hierarchical organizations, a BPM project usually focuses on process redesign. So, the case study

discussed in Section 5 describes a public sector experience in this context.

In general, there are several approaches to carrying out a BPI initiative. Rashid & Ahmad (2013) identifies and summarizes eight methodologies used in BPI: MIPI (Model-Based Integrated Process Improvement) Methodology, Super Methodology, Benchmarking Methodology, PDCA (Plan-Do-Check-Act) cycles, Lean Thinking, Six Sigma, Kaizen, and TQM (Total Quality Management).

MIPI Methodology is a comprehensive approach developed by Adesola & Baines (2005) to enhance business process improvement in organizations. This generic model comprises phases of understanding business needs, modelling, and reviewing new processes. It provides a hierarchical structure with elements such as aim, actions, people involved, checklists, and relevant tools. MIPI helps organizations select and address the main barriers to achieving their vision and mission, aligning with business needs. Its generic nature may lead to limitations in addressing specific industry nuances. The hierarchical structure, while providing guidance, may also introduce complexity. The *Super Methodology* proposed by Lee and Chuah (2001) combines continuous process improvement (CPI), business process reengineering (BPR), and benchmarking (BPB). This approach recognizes that not all organizations can benefit from each, and a combination may be more suitable. The Super Methodology focuses on process selection, understanding, measurement, execution, and reviewing, aiming to make significant improvements, particularly in small to medium-sized companies. The *Benchmarking Methodology* involves continuously comparing an organization's strategy, products, and processes with those of successful counterparts (Dragolea & Cotirlea, 2009). Originating in Japan in the 1950s, it aims to adapt successful practices and ideas to reduce costs and cycle time and enhance competitive positioning. The methodology includes planning, analysis, integration, actions, and maturity phases, with internal and external benchmarking. The *PDCA Methodology* is a continuous improvement cycle developed by Walter Shewhart and popularized by Dr. W. Edwards Deming (Sokovic, 2010). It consists of four phases that emphasize accurate planning, incremental implementation, measurement, and feedback. PDCA is widely used in developing and deploying quality policies within organizations. *Lean Thinking*, originating in Toyota, focuses on reducing waste to improve business performance. The methodology involves sorting, straightening, scrubbing, systematizing, and sustaining activities to eliminate non-value-added elements (Valencia, 2006). Lean is recognized for its effectiveness in both manufacturing and service industries. *Six Sigma Methodology*, introduced by Motorola's Bill Smith in 1986, aims to eliminate errors and defects in business processes (Antony, 2004). The DMAIC phases (Define, Measure, Analyse, Improve, Control) focus on measuring and analysing operational processes, identifying root causes of defects, and implementing improvements. Combining with Lean Manufacturing results in Lean Six Sigma, enhancing savings and efficiency across sectors. The *Kaizen method*, implemented in Japanese industries after World War II, emphasizes continuous improvement through small, incremental changes involving all employees (Radnor, 2010). Utilizing the PDCA cycle, Kaizen fosters a culture of improvement at minimal implementation costs. *TQM is a system* that aims to increase customer satisfaction through continuous improvement (Dahlgaard and Dahlgaard-Park, 2006). It fosters a collaborative culture with active employee participation, focusing on quality, long-term success, and customer satisfaction. The methodology involves process selection, preparation, analysis, redesign, implementation, and improvement, leading to financial, operational, and customer success.

Regardless of their benefits and challenges, many of these methodologies are focused on the industrial and manufacturing sectors. Furthermore, some are not recommended for large companies, such as Super Methodology, and others are too generic or complex, making adopting difficult. Despite these characteristics, these methodologies can be references to more prescriptive approaches. Thus, considering these methodologies, the Boomerang Methodology proposed in this study is firmly based on the PDCA – concerning a process that includes planning, prototyping, evaluation, and continuous improvements – combined with the Design Thinking process concerning the people's collaboration and creativity.

3 COLLABORATION AND CREATIVITY IN BPI

Several approaches, especially those based on design thinking (DT), can be used in BPI, focusing on collaboration and creativity.

The Double Diamond Methodology involves four stages — Discover, Define, Develop, and Deliver. Emphasizing collaboration encourages diverse teams to ideate and refine solutions collaboratively,

ensuring creative input at every stage of BPI (Caulliraux et al., 2020).

The *IDEO's Human-Centered Design* (HCD) framework focuses on understanding user needs and involves continuous collaboration (Rosinsky et al., 2022). Teams work together to empathize with users, define problem areas, ideate creative solutions, and implement iterative prototypes, fostering a collaborative and user-centric BPI process. *IBM's Design Thinking* approach integrates design thinking into problem-solving (Liedtka et al., 2013). It emphasizes collaboration through multidisciplinary teams, encourages user feedback, and employs iterative prototyping. This fosters a creative, user-centric mindset in BPI projects, ensuring the final solutions address stakeholders' needs and experiences. The *Service Design Thinking* approach involves visualizing and improving the entire service experience (Stickdorn et al., 2018). Collaboration is inherent as cross-functional teams work together to understand user journeys, identify pain points, and co-create solutions. This methodology strongly emphasizes creativity and collaboration to enhance the overall service or business process. Finally, Stanford *D.School's Design Thinking* methodology provides tools and methods for design thinking, emphasizing collaboration and creativity (D.School, 2017). It includes brainstorming and prototyping, fostering a hands-on, collaborative approach to problem-solving in BPI. The Boomerang methodology adopted in this current study is based on this methodology.

All these methodologies share common traits of user-centricity, iterative processes, and cross-functional collaboration. They prioritize empathy, ensuring solutions resonate with user needs. Cross-functional teams with diverse perspectives collaborate in problem framing and creative ideation. Visualization techniques, such as prototyping, facilitate hands-on understanding and foster creativity. Open communication encourages the free exchange of ideas, creating a dynamic environment.

It is essential to highlight that, even with all these positive characteristics, stakeholders' different power levels can negatively impact open communication in large, highly hierarchical organizations. In this context, the proposal adopted in this study proved entirely appropriate, as it combines the characteristics of a DT-based process and gamification strategies to guarantee everyone's participation, regardless of the positions involved.

4 RESEARCH METHODOLOGY

This qualitative research adopts action research and the case study method. According to Patton (2002), research is said to be qualitative when it aims to investigate what people do, know, think, and feel through data collection techniques such as observation, interviews, questionnaires, document analysis, interactive dynamics, and among others. Merriam & Tisdell (2015) explain that action research is an approach that aims to solve a problem in practice, contributing to the research process itself and addressing a specific problem in an authentic environment such as an organization. Johansson (2007) highlights that the case study must have a "case" that is the object of study, which must be a complex functional unit, be investigated in its natural context with different methods, and be contemporary. It is common for case studies to use several research methods, considered a "meta-method," allowing data collection from various sources and at different times, which need to be cross analysed for consistent considerations and conclusions.

The following subsections will present the research steps and BPI methodology used in the case study to clarify how the research was conducted.

4.1 Research Steps

The current study continues the applied research published in (Picanço & Santos, 2022). The original study's research problem was engaging, stimulating, and motivating stakeholders in BPI projects. With practical motivation, based on evidence found in the authors' work environment, interviews with process stakeholders, related studies in the literature, exploratory research on creative companies, and an investigation of collaboration and management techniques, a methodology based on Design Thinking (DT) and gamification strategy was defined, called Boomerang Methodology. Figure 1 illustrates the research process in summary.

The methodology was created following the Design Science Research (DSR) method by Hevner (2004) in three PDCA (Plan-Do-Check-Act) cycles. During the creation process, the methodology evolved to define stages based on a DT process (cycle 1) and the need to build a collaborative game for the ideation stage (cycle 2), which generally requires greater participant creativity.

In (Picanço & Santos, 2022), considering evaluating the usability and usefulness of the methodology, a first case study was carried out on a simple and short BPM project aimed at improving the

monitor selection process in a higher education institution (cycle 3). The results were very positive, in addition to identifying lessons learned and used as recommendations for use (guides).

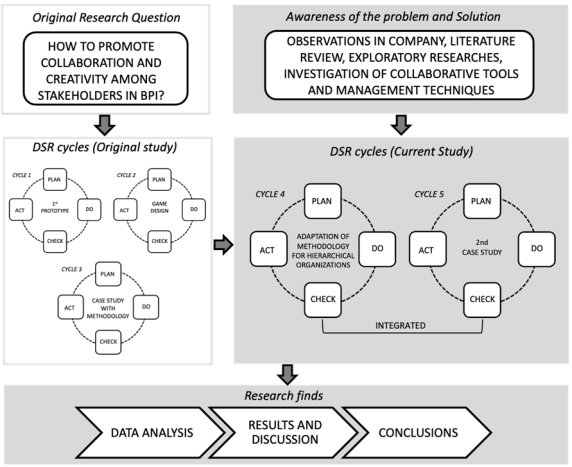

Figure 1: Methodology framework.

Continuing this research, the current study sought to apply the Boomerang methodology in a complex BPM project. Identifying the same problems as the original research related to stakeholders' motivation, engagement, and collaboration in business process improvement projects, the methodology was quickly identified as an appropriate strategy by the consultants in this BPM project. Considering the institution's characteristics (large, highly hierarchical, and public sector) and the BPM project (legal sector processes, strongly human-centered and knowledge-intensive), some adaptations to the Boomerang methodology were necessary (cycle 4), enabling its use in this new scenario, detailed in the next section. The new case study is detailed in Section 5 (cycle 5). It is important to emphasize that both check steps of DSR cycles 4 and 5 were carried out through feedback from participants in the case study described in this paper, discussed in Section 5.

4.2 Adapting BPI Methodology

The objective of the Boomerang Methodology is to support the process analyst or any manager in a BPM project in business process redesign activities (Picanço & Santos, 2022). This support is based on a DT process in five stages: empathize, define, imagine, prototype, and test. Each stage involves activities, guidelines for conducting these activities, recommendations for artifacts and support tools for each, and the definition of expected results. Figure 2 illustrates the Methodology process. The description of these activities, guidelines, recommendations, and expected results can be found in (Picanço & Santos, 2022).

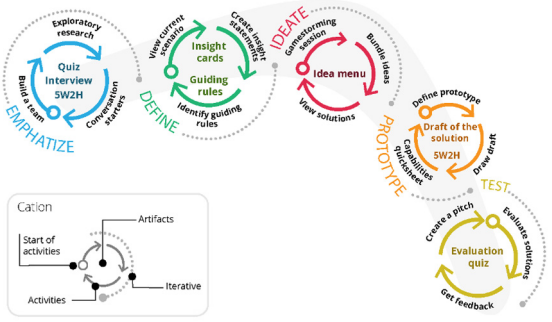

Figure 2: Boomerang Methodology. Source: (Picanço & Santos, 2022).

The Boomerang Methodology was developed to motivate, engage, and stimulate business process stakeholders' involvement, participation, and creativity, focusing on BPI. To achieve this, the Methodology is based on four principles: Innovation & creativity, aiming to bring together people to collaborate in solving problems in exchange for recognition and offering new experiences to improve processes; Engagement, seeking collaboration mechanisms and promoting people's involvement and motivation; Agility, understanding people's desires and speeding up the production of ideas through learning from errors and rapid evolution; Adaptability, and can be applied and adapted to different contexts and organizations.

Considering these principles, the Boomerang Methodology was presented to a group of managers and process analysts from a process office of a large public institution in Law during the phase of proposing improvements in a BPM project. This group comprised six members: a process office manager, a project manager, two process analysts, and two BPM specialists. From this presentation and discussions, it was decided to adopt the methodology in a workshop format, as recommended in (Picanço & Santos, 2022). Considering the institution's characteristics, the need for some adaptations to the Methodology was pointed out. The following subsections describe the main changes at each stage.

4.2.1 Empathize

According to (Picanço & Santos, 2022), this phase is concerned with ensuring empathy, recovering people's stories, identifying the researched community members, and beginning to understand the problem to be solved. This stage has the following

activities: team building, exploratory research, and conversation initiation.

Considering the model of large hierarchical institutions, forming teams involves selecting key stakeholders involved with the process to be redesigned and the need to maintain heterogeneous teams concerning their roles and responsibilities. These considerations reflect the need to form teams that involve business areas (owners, users, and process managers) and technology (systems and infrastructure), in addition to participants with skills in process modelling, such as the process analyst, and with the power to conduct the workshop, as the process office manager. It is essential to highlight that, in complex processes, it is common for many stakeholders to be involved in activities related to various functional sectors. As a cross-functional strategy, it is essential to identify which key stakeholders should participate and define the number of teams, enabling the effectiveness of the results and control of the workshop.

Exploratory research activities often involve the need for preparation on the part of workshop participants so that they can contribute to proposing improvements. Therefore, guests must receive a communication explaining the project objectives, the list of participants, and the expected results of the event days before the meeting. Considering that large projects involve their stakeholders from the initial planning phase, it is natural that most guests already know each other. However, a self-introduction by each participant is recommended as part of the event's opening. Finally, it is also important to establish good conduct agreements for the workshop, such as avoiding cell phone use, staying focused on your team's work, and respecting time control.

4.2.2 Define

This step seeks a deep understanding of the needs, constraints, and challenges to be faced through the following activities: visualizing the current scenario, creating an insights statement, and identifying guiding rules.

In this study, this stage did not change; we only reinforced some recommendations. The first of these concerns the current scenario. Even considering that the process improvement workshop is a step in the BPM life cycle after other interactive steps of the BPM project (such as planning, modelling of the current process, and process analysis), it is crucial to post the current process model (model As-Is) in the environment where the in-person event will take place so that stakeholders can consult it if necessary.

It is essential to note that this model should not be entirely unknown to the participants, as it would involve time spent explaining the process that would compromise the improvement workshop's objectives. Therefore, this model must be part of the information necessary to prepare the meeting, provided for in the previous stage of the methodology (Empathy). Another critical point is to bring consolidated results of earlier stages of the BPM cycle to the workshop, such as initial ideas for solutions discussed in the process analysis (insights) and guiding criteria such as prerequisites, assumptions, and restrictions for idealizing improvements.

4.2.3 Ideate

The Ideate stage aims to create new opportunities and solutions for the challenge of process improvements, containing the following activities: gamestorming session, combining best solutions, and visualizing solutions. The gamestorming activity is supported by the game (Creative Thinking Planning game or CTP, for short), developed in the second design cycle of the methodology, allowing each participant to propose ideas that are voted on by others, approving or disapproving them. This was the main adaptation made to the methodology.

In the initial version, the CTP game considered forming a single team whose participants interact with each other in proposing ideas and voting. So, the first change was to adapt the game for multiple teams. In the context of complex processes, a good practice adopted by the market is to design the model as a macro process composed of sub-processes. Thus, multiple team formation favours identifying improvements by sub-processes and provides an integrated vision between the teams in understanding the macro process. The second change was to adapt the game's dynamics to enable short encounters of 3-4 hours in length, considering multiple teams and many ideas to manage. To achieve this, the number of ideas to be defended by each team was limited, even though several ideas were discussed among its members. Finally, rejected ideas were discarded in the initial version, while in this new version, rejected ideas are recorded in a history of ideas, justifying the results. The case study section will discuss this phase and game dynamics.

4.2.4 Prototype

The Prototype stage results in implementing the ideas generated in the previous stage through a new design of the suggested process (To-Be model), in addition to analysing the feasibility of the proposed solution

(Picanço & Santos, 2022). This stage has the following activities: the definition of a prototype with the selected ideas, the design of the improved process draft, and the capabilities spreadsheet to support the feasibility analysis.

Two main updates were made at this stage. Considering the complexity of the process under discussion and the work with multiple teams, the first recommendation is that the process design can be built by sub-processes led by their respective teams. Planning time for integration between process models during the workshop is essential, giving all stakeholders a holistic view of the complete process. The second update was the creation of a spreadsheet to record ideas, with information on who, how, and when to implement the solutions. This spreadsheet also has specific tabs for analysing feasibility from economic, technological, and chronological perspectives, supporting the process analyst in completing this stage. The case study will present more details about this artifact in the next section.

4.2.5 Test

The Test phase supports feedback from those involved more broadly, considering information sharing among everyone. This stage has the following activities: evaluate solutions, create a pitch, and obtain feedback. The methodology maintained these activities, including the time necessary for each team to present the ideas incorporated in the draft To-Be process and for debates about these ideas, capabilities, and information about implementation and feasibility. It is essential to highlight that all participants voted on and approved all ideas incorporated in the draft process designed in the workshop.

After the workshop, a more detailed assessment was carried out with all participants using an electronic form consisting of seven questions (five objective and two subjective). The objective questions related to the information shared, group work, activity quality, methodology, and workshop conduction. These questions were segmented into statement items, subject to evaluation based on the Likert scale of five values: strongly disagree (SD), partially disagree (PD), neither agree nor disagree (NN), partially agree (PA), and strongly agree (SA). Subjective questions refer to positive points and points for improvement. More details about the application of these assessments will also be described in the case study section.

4.2.6 Comparing Boomerang with Others BPI Methodologies

The Boomerang method is unique in its structured yet flexible approach, incorporating elements like gamification for engagement, a straightforward five-stage process for innovation, and adaptability to different organizational contexts. It aims to make the process improvement experience more engaging and innovative, contrasting with methodologies that may focus more on efficiency, standardization, or statistical control. Unlike Boomerang, MIPI is more about harmonizing existing processes with standards and less about innovation and engagement. The Super Methodology, while also versatile, may not specifically prioritize user experience and rapid ideation as Boomerang does with its five stages. Considering the Benchmarking Methodology, Boomerang emphasizes internal innovation and creative problem-solving rather than external comparison. Boomerang shares a cyclic nature (through its stages) as PDCA cycles but adds a strong focus on creativity and user engagement. Unlike Boomerang, Lean Thinking is more about streamlining and efficiency than exploring innovative solutions. Boomerang, while potentially benefiting from Six Sigma's analytical rigor, places more emphasis on ideation and adaptability. Kaizen and Boomerang emphasize engagement, but Boomerang specifically incorporates gamification and a structured five-stage process. TQM shares a focus on quality and involvement with Boomerang but may not explicitly prioritize rapid prototyping and testing.

5 CASE STUDY

The case study was conducted in a Pernambuco Court of Justice (Brazil) by its BPM Office (BPMO) with the support of a consulting team from the Centre of Informatics at UFPE University. The institution is part of the public sector and has a low level of maturity in BPM. There are a few documented processes, some developed by the BPMO, but the IT sector developed most.

In BPI workshop, the BPMO focused on the *Repetitive Demand Resolution Incident* (RDRI) process, considering its impact on the efficiency of the judgments. The RDRI consists of generating and setting a standardized judicial solution (legal thesis) that can solve a mass of repetitive similar demands that enter the institution (lawsuits filed in court). The main intention was to optimize that process and allow to monitor its performance. Between the start of the

process and the generated decision application, a list of procedures needs to be executed by different roles and sectors. So, the process redesign was mapped during the first phases of the pilot project with the cooperation of diverse process stakeholders.

All stakeholders already knew the current state of the process, and the BPMO needed their collaboration to propose solutions for the problems and challenges. At that moment, some concerns arose regarding the engagement of stakeholders in this activity due to this highly hierarchical environment.

The proposal to use the Boomerang Methodology was grounded in the idea of active participation of stakeholders from different sectors and mindsets. There was a consensus that gamification would make it possible to reduce certain inhibiting factors. Thus, it was expected that all participants, not just the magistrates, would feel confident in proposing and approving – or rejecting – new ideas.

5.1 Applying BPI Approach

5.1.1 Empathize

The first stage was organically developed during the BPM lifecycle's Design (As-Is modelling) and Analysis phases. Since then, the involved team of stakeholders has been collaborating with the understanding of needs, problems to be solved, and challenges in the process.

The first activity, “Build a Team,” was based on the team of stakeholders of the project and other collaborators with qualification or expertise related to the theme and with different responsibilities. With the help of the Strategic Management sector, the workshop teams with seven facilitators (from BPMO and consulting team) and 15 participants (project stakeholders) were defined. From that moment of defining participants, there had already been the intention of composing heterogeneous groups. To optimize the workshop execution, the participants were divided into three heterogenous groups, each with five members from different professional areas: Process Operations, Process Management, Legal (Magistrate), and IT.

The “Exploratory Research” was mainly the compilation by the BPMO of the most relevant information collected from interviews, meetings, and questionnaires applied before the BPI workshop. Many of the participants' teams had already collaborated with the project precisely by providing information about the process. Furthermore, the entire defined group was familiar with the ongoing project.

5.1.2 Define

According to the Boomerang Methodology, the first activity of this second stage, "View Current Scenario," consisted of presenting the current process (As-Is) to the participants' team. Even though most of them participated in the As-Is modelling workshop the semester before, the visualization would be crucial to rekindle everyone's memory and focus on the workshop's goals. The BPMO team plotted the As-Is model and posted it on one of the room's walls to optimize the time available to hold the workshop event, as shown in Figure 3.

Figure 3: As-Is model plotted in the event.

The activities for creating an insight statement were also previously developed by the BPMO based on the information gathered until then. That way, the Boomerang Methodology cards were set to start the CTP game: 1) Challenge Cards were oriented by the process indicators previously defined by the institution's Strategic Plan, for example, the average time to judge cases; 2) Insight Cards were based on general ideas already given by some stakeholders in the As-Is process analysis. Still, it was identifying guiding rules related to the premises and restrictions of the BPM project.

5.1.3 Ideate

The third Boomerang Methodology stage began with the division of participants into three different predetermined groups in different tables. A facilitator with prior knowledge of BPM was assigned to assist at each table. Four more facilitators were assigned to perform the following activities: (1) introduce the game dynamics and conduct the activities, (2) support the voting process using a platform specialized in game-based learning, and (3) assist all other facilitators and participants. Figure 4 illustrates the game dynamic.

After explaining the play mechanics, the gamestorming began with the introduction of a Challenge Card. The related guiding criteria and Insight Cards were then presented.

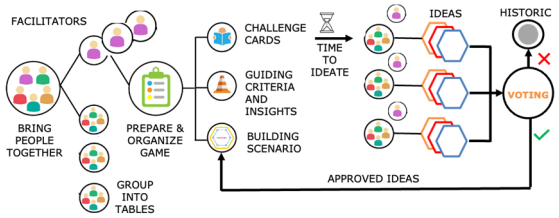

Figure 4: CTP Game dynamic. Source (Picanço & Santos, 2022).

Each group had the opportunity to (1) discuss internally the problem presented, (2) think of possible solutions, (3) choose one to three of them to register on the blue anagram card (a hexagon-shaped paper card), and finally (4) present and submit their idea(s) for consideration and voting by the other participants. Activities 1 to 3 took 20 minutes, and all group members participated intensely. Activity 4, which took 2 minutes, was led by a group speaker aided by colleagues' commentaries, and voting took 2 minutes. A timer projected on one of the room's walls controlled the duration of activities. From the tutor's perspective, the motivation and engagement of participants in these activities were evident, as will be shown in Section 5.2.

This cycle was performed three times, one for each Challenge Card introduced. Of the nine anagrams presented, only one was not approved by the other groups. It is important to highlight that the unapproved idea was from a magistrate participant (top management), highlighting how democratic this approach is. The approved ideas were placed near their respective yellow anagram cards (Organization, People, and Technology), forming a hive, and thus showing their connections with each of the themes represented on the cards, as shown in Figure 5.

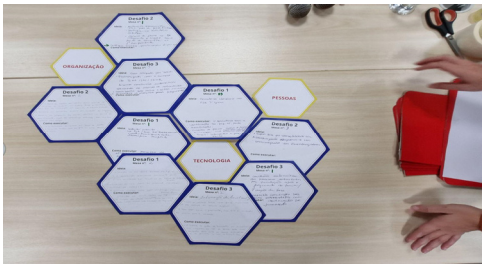

Figure 5: Approved solutions posted in an anagram.

5.1.4 Prototype

At this stage, the groups registered the approved solutions on the "Menu of Ideas." Then, with the help of BPM analysts (facilitators), the solutions mentioned above were designed in BPMN.

The first activity was to define a prototype with the approved ideas. To reduce redundancy among similar submissions, it was agreed that only one of the groups that suggested overlapping ideas would be responsible for modelling them.

After that, the groups filled out the capabilities spreadsheet to support the feasibility analysis of each approved idea. The time spent for these two activities was 1 1/2 hours, and by the end, except for only one solution, all the others were prototyped in BPMN and had their feasibility sheets filled. Figure 6 shows one of these prototypes, after process update.

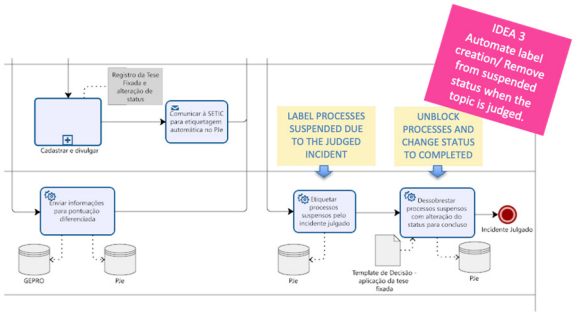

Figure 6: Process model considering idea 3.

5.1.5 Test

The last Boomerang Methodology stage is intended to consolidate the ideas generated for the new process during the event. Considering the limitation of time to execute the workshop, the BMPO decided previously that this stage activities would be mainly realized asynchronously. Therefore, the first and second activities, "Evaluate Solutions" and "Create a Pitch," were developed by the BPMO team as part of the BPM Lifecycle To-Be stage. The "Evaluate Solutions" activity was carried out from 3 perspectives of viability: technological, economic, and chronological. Based on the information gathered with stakeholders, each solution was rated from 1 to 10 in these three aspects. This information is relevant to rank and select the solutions implemented at the BPM Lifecycle Implantation stage.

5.2 Assessment & Analysis

The last Boomerang Methodology activity, "Obtain Feedback," was executed through an electronic form sent to the workshop participants. To coordinate the collected data, the research was carried out from the following perspectives: information shared, group work, activity quality, Boomerang methodology, workshop conduction, the positive points, and, finally, points for improvement. The first five questions were objective ones. This evaluation is based on the assessment model proposed in (Picanço & Santos, 2022), considering the usability and utility of the approach.

Regarding the information provided to realize the activities, 100% of the interviewees agree (strongly and partially) that it was enough and clearly and objectively presented, as shown in Figure 7.

About the group of participants, 100% agree (most strongly) that the selected participants had full knowledge about the process and showed engagement during the event, as shown in Figure 8. There were no conflicts between the participants, and 88% (strongly agree) indicated that everyone who needed to participate attended the workshop.

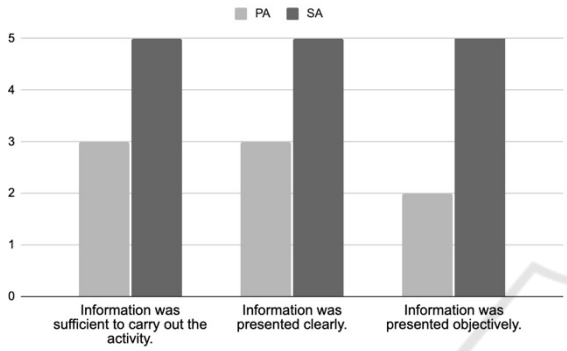

Figure 7: Information shared results.

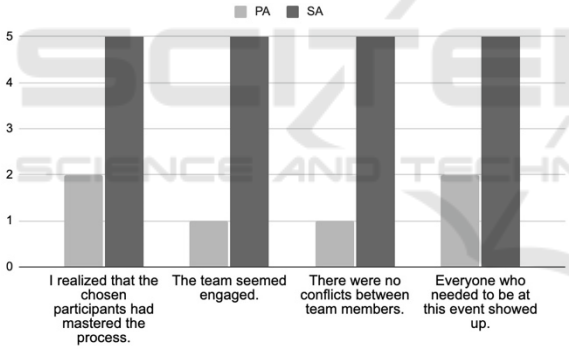

Figure 8: Group work results.

Regarding their feelings about the overall workshop (Figure 9), 100% of the interviewees agree (most strongly) that they felt motivated during the activities, stated that they would participate again to identify solutions, that the seminar had contributed to a better understanding of the process, and that the activities can stimulate creativity and innovation, and opined that the workshop dynamics promoted the interactions between participants.

Regarding the technique adopted (Figure 10), 100% of the respondents agree that most people would learn the methodology easily and that the Boomerang was capable of extracting their knowledge about the process; 88% reported that the Boomerang is entirely adequate to improve business processes, that they felt it trustworthy, that they felt comfortable to apply the concepts and techniques into real-life situations, and that the workshop offered practical examples that helped the better understanding of the gamification; and 75% opined that the technical support is needed to utilize the techniques and disagreed that the Boomerang does not favour the contribution with essential insights.

About the process analysts that conducted the workshop (Figure 11), 100% agree (strongly and partially) that the analysts conducted well the workshop dynamics and 88% had the perception that the analysts had experience with process mapping and had a domain of the Boomerang application.

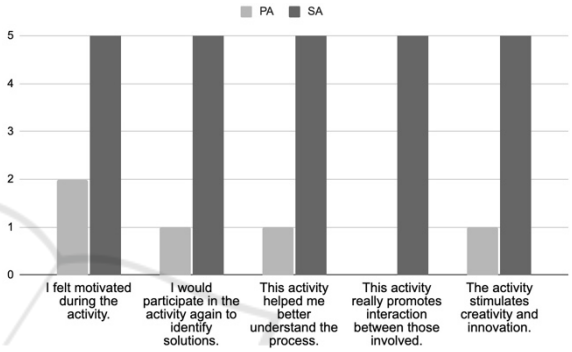

Figure 9: Quality activity results.

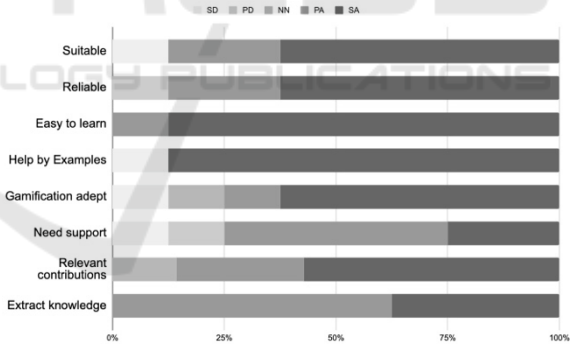

Figure 10: Methodology results.

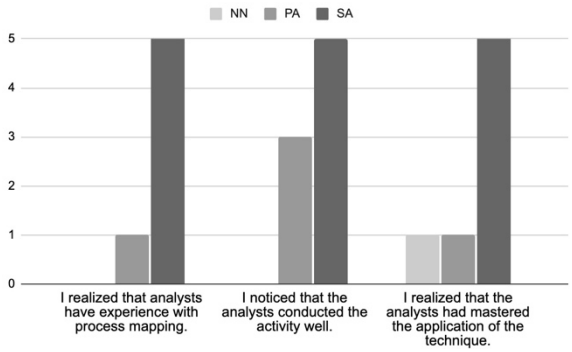

Figure 11: Workshop conduction results.

The last two questions were subjective. The first subjective question asked about the positive points of the workshop. The respondents highlighted the clarity and objectivity of the explanations, the interaction, the engagement, the acquisition of knowledge, the plurality of professionals involved, and the suitable place to carry on the activities.

Finally, the second subjective question asked for points for improvement. The interviewees pointed out that there should be more time to debate since some of the participants couldn't always contribute because of that limitation; the voting system adopted could be a better one; it would be better for the competition if there were more clarity about the level of development of the ideas; it would be better if the event had more breaks because the overall duration of the event.

5.3 Discussions: Lessons Learned and Guidelines

Adopting the Boomerang Methodology in the BPM project in a large, highly hierarchical organization revealed opportunities and challenges. On the one hand, it was easy to integrate the approach into the BPI stage, benefiting from the outputs generated in the previous stages of the BPM cycle. On the other hand, we encounter difficulties due to common factors when applying new dynamics with heterogeneous groups in interests and levels of power. As main lessons learned and guidelines, we highlight the following:

Simplification of the initial steps: The Empathize and Define steps could be executed quickly and objectively since both the potential participants and the information about the As-Is process were already mapped. Thus, the Boomerang Methodology's initial stage can be simplified when adopted in a large project as part of a BPM cycle.

Number of challenges for the Ideate stage: An aspect identified in the Define stage was related to the number of possible obstacles to be proposed. Ten specific problems had already been detected in the As-Is process. Still, as there was not enough time to apply the dynamics aimed at all of them, the BPMO team needed to abstract the problems according to the process phases, and, therefore, some possible emphases could not be taken advantage of. This situation indicated that an analysis of the BPMO is necessary during the planning of the BPI workshop, sizing the workshop based on the perspectives of quantity and complexity of the challenges and time control. Depending on the case, more than one workshop may be necessary to meet the desired objectives without compromising the involvement and motivation of participants.

Coordination of the game: It is important to highlight two other aspects of this phase. The first relates to redundant ideas of possible solutions for each challenge since the groups developed solution ideas simultaneously and without knowing the other teams' ideas. In the case of redundant ideas, consider the score for all groups involved. The second aspect concerns care with the voting system. The original system proposed by the Boomerang Methodology is based on coins and (tangible) paper. In the case study, an electronic system was adopted, and some participants who did not know how to use the voting tool correctly voted for ideas that had not yet been presented, causing the system to be restarted a few times and causing a waste of time.

Process prototype: a lesson learned in the Prototype stage was the application of BPM notation to model the new process based on the approved solutions. As months have passed since the As-Is process modelling event, many participants have forgotten the BPMN notation. At the end of the event, when there was not much more time available, the facilitators had to act as process modelers. Therefore, it is essential to highlight the BPM notation to participants and display the As-Is models placed on the walls.

Assessment of approved ideas: As BPMO carried out the Testing stage based on all the information collected in the workshop, some doubts arose in the validation meeting, especially when the solution presented involved redundant ideas with slight differences between them. Even so, this mishap was resolved through debate and voting. In the end, there was consensus on applying the approved solutions in the new To-Be process.

6 CONCLUSIONS

In large, highly hierarchical organizations, it becomes a significant challenge to objectively improve a business process in a participatory and creative way. The challenges are even more significant when these processes are human-centred and knowledge-intensive in a traditional organizational structure, dependent on different interests and power levels. In this scenario, BPI approaches based on Design Thinking and engagement strategies, such as gamification, can involve and motivate different professionals and perspectives with a business process and its needs, developing a cross-functional vision of the BPM organization and culture. The case

study and evaluations indicated that the main objective was achieved. As a result, a new business process was implemented in the organization, and the Boomerang methodology was incorporated into the BPMO methodology.

In future works, new BPM projects will be initiated in this organization, considering the lessons and recommendations learned in this study for BPI stage.

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