

A2BP: A Method for Ambidextrous Analysis of Business Process

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Abstract: In recent years, organizations have a growing concern to continually improve their processes and align them to satisfy clients' expectations, needs and experience. Traditionally, the discipline of Business Process Management (BPM) focuses on 'inside-out' improvement of business processes that do not provide appropriate capabilities and techniques to explore 'outside-in' opportunities. Design Thinking and Organizational Ambidexterity are approaches that allow a balance between improving internal efficiency, as well as supporting the analysis of the external environment in search of innovation. Inspired by these approaches, our study aims to investigate how to exploit internal problems and explore external opportunities of business processes. The main contribution of this paper is the design of a method called A2BP that systematizes the analysis phase of BPM lifecycle by proposing exploitative and exploratory techniques. We evaluated the A2BP method by means of expert opinion survey and observational case study to assess its usefulness and ease-of-use. Overall, the evaluation of the method was positive and constructive feedback was obtained to further refine the method in future studies.

1 INTRODUCTION

Business Process Management (BPM) is a holistic management approach that has grown substantially in the last decades. BPM has a strong focus on information technology advances (van der Aalst, 2012). BPM is considered an assembly of techniques to support the continuous and iterative improvement of business processes in an organization (OMG, 2010). Examples of techniques normally used are: Ishikawa Diagram, SWOT Analysis, Cycle Time Analysis, Risk Analysis, and Gap Analysis.

However, Rosemann (2014) affirms that BPM as a managerial discipline does not seem to be sufficiently capable to harvest the potential of a dynamic and opportunity-rich environment. One main reason is because current BPM capabilities are largely following an 'inside-out' paradigm, also called analytical thinking. This paradigm addresses management through exploitation techniques that repeat themselves continuously over time (Martin, 2009).

Kohlborn et al. (2014) suggests that it is necessary to complement a traditional BPM approach with the 'outside-in' paradigm, also called intuitive thinking. Intuitive thinking uses exploration techniques. It is centered in the convergence and

divergence of ideas by using creativity, originality, and innovation techniques (Martin, 2009).

Ambidextrous organizations have capabilities to manage both analytical and intuitive thinking. It encompasses two profoundly different features of businesses - those focused on exploiting existing capabilities for incremental improvements and those focused on exploring new opportunities for growth. As Table 1 indicates, the two features require very different strategies, structures, processes, and cultures (O'Reilly and Tushman, 2004; He and Wong, 2004).

By deploying the idea of ambidextrous organizations to the Business Process Management discipline, Rosemann (2014) proposes the concepts Exploitative BPM and Explorative BPM. Exploitative BPM is aiming towards running and incrementally improving business processes. Exploitative analysis capabilities are dedicated to assessing current processes with the aim to identify and quantify process problems. Exploitative BPM serves well industries and organizations with largely static market conditions (e.g., banking back-offices, shared service providers, and mass production).

On the other hand, Rosemann (2014) affirms that Explorative BPM is a significant future opportunity, and challenge for the BPM community. Explorative

Table 1: Alignment for ambidextrous features.

Alignment of:	Exploitative	Exploratory
Strategic intent	Cost, profit	Innovation
Critical tasks	Operations, efficiency, incremental innovation	Adaptability, new products, breakthrough innovation
Competencies	Operational	Entrepreneurial
Structure	Formal, mechanistic	Adaptive, loose
Controls, rewards	Margins, productivity	Milestones, growth
Culture	Efficiency, low risk, quality, customers	Risk taking, speed, flexibility
Leadership role	Authoritative	Visionary

BPM is about crafting process visions that are so compelling and transformational that they motivate staff and customers, involved to explore how to make a desired future state via a sequence of transition states a reality, and by doing this turns the current process obsolete. This is in sharp contrast to exploitative BPM, which develops new (to-be) processes in light of current shortcomings.

The balance between exploitation and exploration, or between incremental and radical organizational change has been a consistent theme across several approaches to research in organizational adaptation (O'Reilly and Tushman, 2004; Bauer and Leker, 2013; Chen and Katila, 2008). Design thinking is a well-established approach that follows the 'outside-in' paradigm. According to Brown and Wyatt (2010), design thinking is an approach to support innovation and that aims to align analytical with intuitive thinking. Design thinking generates an environment highly interactive and promotes innovation through the following steps: empathy, define, ideate and prototype.

Richardson et al. (2013) emphasizes that instead of focusing on surface adoption of new customer experience methods and techniques, design thinking forces BPM teams to think about process problems from a completely different perspective. This allows teams to be more effective in their interactions with executives, line-of-business owners, and stakeholders when focused on improving and optimizing for customer experience.

Despite the high number of studies promoting the use of design thinking to create innovative products and services (Brown, 2009; Martin, 2009; Chasanidou et al., 2014), few studies in the BPM area propose an integrated use of exploitative and explorative techniques to support designing and

innovation of business processes models aligned to expectation, experience and satisfaction of customers (Rosemann, 2014; Richardson et al., 2013; Luebbe and Weske, 2011).

Traditionally, business processes are analyzed in a qualitative or quantitative form with the purpose to exploit, reduce or eliminate existing problems in the processes, such as bottlenecks, financial or resources waste, cycle time and handworks (ABPMP, 2013; Jeston and Nelis, 2008). Business process analysis is an important phase of the BPM lifecycle because it provides a critical examination of problems and potential improvements of business processes. However, few studies have been conducted to provide novel techniques and methods for the business process analysis phase (Vergidis al., 2008; Kohlborn et al., 2014).

This paper aims to contribute to the emerging area of ambidextrous BPM. In particular, our research focuses on the phase of business process analysis. Motivated by this scenario, the main research problem of this study is to investigate: *how to exploit internal problems and explore external opportunities of business process?* This paper aims to investigate the following research questions:

(RQ1) What are the features of a method that supports the ambidextrous analysis of business processes?

(RQ2) How is the ease-of-use and usefulness perceived by process analysts of the proposed method for ambidextrous analysis of business processes?

The main contribution of this paper is to design a method to support the ambidextrous analysis of business process. The method was evaluated through an expert opinion survey and an observational case study at an organization with experience in BPM.

The rest of the paper is organized as follows. Section 2 outlines the research method. Section 3 describes the proposed method called A2BP. Section 4 presents the results of the empirical study. Finally, Section 5 discusses the conclusions and presents directions for future work.

2 RESEARCH METHOD

Given that our goal is to create a useful artifact, we purposefully chose a Design Science Research (DSR) approach. Hevner et al. (2004) propose that DSR artifacts are defined as constructs (vocabulary and symbols), models (abstractions and representations), methods (algorithms and practices) and instantiations (systems or prototypes).

The DSR approach is suitable to address our research objective and questions because it emphasizes the investigation of a method artifact with a problem context in order to improve the business process analysis in organizational context. Moreover, DSR guides us through an iterative, yet structured process of building and evaluating the artifact. In sum, this approach provides a well-suited base to build an artifact of high utility, closely connected to extant knowledge and a relevant, real-world problem (Hevner et al., 2004; Wieringa, 2014).

As presented in Figure 1, our study adopts the DSR framework suggested by Wieringa (2014). The social context contains the stakeholders who may affect the project or may be affected by it. In our case, the stakeholders are business process analysts, business specialists, internal stakeholders and customers of the organization. The knowledge context consists of existing theories from science and engineering, useful facts about currently available products. Our research was grounded in the following areas of knowledge: BPM, Design Thinking, Organizational Ambidexterity and Design Science Research.

Initially, we defined the problem and the research questions through a systematic literature mapping. In order to investigate the research problem stated in Section 1, automatic searches were conducted in the digital libraries of the Association for Computing Machinery (ACM), the IEEE Computer Society, Emerald Insight, Science Direct and Springer Link.

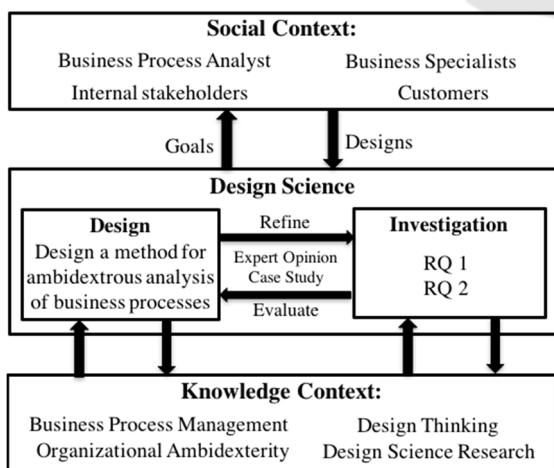


Figure 1: Instantiation of the DSR framework (Wieringa, 2014) in the context of our research.

We also used the pearl growing research strategy cited by (Ramer, 2005). This strategy is similar to

snowball sampling strategy, but its focus is to investigate the references used by the most relevant articles of the main authors of the area.

Then, we designed the artifact called A2BP method, which aims to investigate how to exploit internal problems and explore external opportunities of business. A core feature of the Design Science Research is the empirical evaluation of the artifacts in the appropriate environment. Thus, an expert opinion survey with seven participants was conducted in order to analyze the ease-of-use and usefulness of the proposed method A2BP before evaluating it in an organization. According to Wieringa (2014), expert opinion is the simplest way to validate an artifact. The design of an artifact is submitted to a panel of experts, who imagine how such an artifact will interact with problem contexts imagined by them and then predict what effects they think this would have. The experts are used as instruments to “observe”, by imagining, a validation model of the artifact.

To conduct the expert opinion, an e-mail was sent explaining the context of the research to experts. It included the time needed for evaluation, a link to the website where the artifact is available (i.e. the A2BP method) and a link to the evaluation survey. After the critical analysis of the proposed artifact, experts answered the semi-structured questionnaire. It was categorized as follows: perceived ease-of-use, perceived usefulness, suggestions, and criticisms. The results of the expert opinion are presented in Section 4.1.

The artifact was adjusted according to the recommendations of the experts. Then, we carried out an observational case study in a public sector organization with the goal to conduct an empirical evaluation of the proposed method. Wieringa (2014) highlights that observational case studies are a useful research method for implementation evaluation and problem investigation, where the researcher investigates the real world.

The case organization conducts a BPM initiative for five years and has a Business Process Management Office (BPMP) that plans and manages several organization-wide business process improvement projects. The criterion to select this case was intentional, which as defined by Merriam (1998), it is suitable for research of a qualitative nature, aiming at the selection of a context that is meaningful to the studied phenomenon. The specific objective of this case study is to evaluate the ease-of-use and usefulness of the A2BP Method to support the needs of an ambidextrous analysis of business processes by an organization. In addition,

the case study provided a rich feedback for us to further improve the proposed method.

The case study participants included one BPM manager and two analysts as the team responsible for ambidextrous business analysis process. The BPMO coordinator participated in some meetings and activities in order to appraise the A2BP method. One researcher was present during the whole case study to observe and make notes in a diary about everything that happened.

We also provided a journal for participants to write their experiences and provide critical reflections on the use of A2BP method. Furthermore, they reported their experiences regarding each method phase, tasks and activities conducted by them. Finally, we designed a semi-structured questionnaire and applied to the BPMO coordinator, the BPM manager and the two process analysts. This questionnaire was similar to the instrument of the expert opinion survey. After finishing the case study, a new version of the artifact was generated based on the suggestions provided by participants. The results of the case study are described in Section 4.2.

3 A2BP: A METHOD FOR AMBIDEXTROUS ANALYSIS OF BUSINESS PROCESSES

In this section, we describe the artifact characterized as a method according to Design Science Research. The proposed method seeks answer the research problem: *how to exploit internal problems and explore external opportunities of business process?* Our aim is to support the phase of business process analysis by means of a novel method that stimulates both analytical and intuitive thinking. Hevner et al. (2004) state that a method is “a set of steps required to perform a given task”. It can be graphically represented or encapsulated in specific algorithms and heuristics. Methods promote both the construction and representation of the needs for improvement of a phenomenon in a given context.

Aiming to design a new business process model that addresses the characteristics of operational efficiency and organizational innovation, the phase of business process analysis should be conducted differently from the conventional form (Vergidis et al. 2008). To identify new opportunities, understand customers’ needs and generate creative solutions, it is necessary the inclusion of design and innovation

concepts in the process analysis phase (Rosemann, 2014).

In order to systematize the analysis of business process, our method is categorized into: phases, steps, activities, tasks, techniques and expected results. Figure 2 presents an abstraction of these elements proposed by the A2BP method. This categorization was developed based on the PMBOK, which the phases refer to the process groups (initiating, planning, executing, monitoring and closing); the tasks are the inputs; the techniques are the tools; and the expected results are the outputs (PMI, 2013).

As shown in Figure 2, we divided the business process analysis into **planning**, **executing** and **closing phases**. The planning phase aims to create the analysis plan to guide the entire execution. The execution phase is categorized in steps according to design thinking approach (Brown and Wyatt, 2010): empathize, define, ideate and prototype. Finally, the closing phase involves the review of the data collected and generation of the final documentation of business process analysis. We suggest the use of the method by any organizational unit, such as the BPMO. The BPM manager and analyst team can conduct the method during the analysis phase of the BPM cycle.

For each phase of the A2BP, we established a set of activities to be performed by the team. In order to identify key improvements and key opportunities of innovation in the business process, we have placed the steps of design thinking inside the executing phase. Also, we suggest that the exploration techniques are used in combination with the exploitation techniques. The exploration techniques suggested by our method are available in (DSCHOOL, 2009).

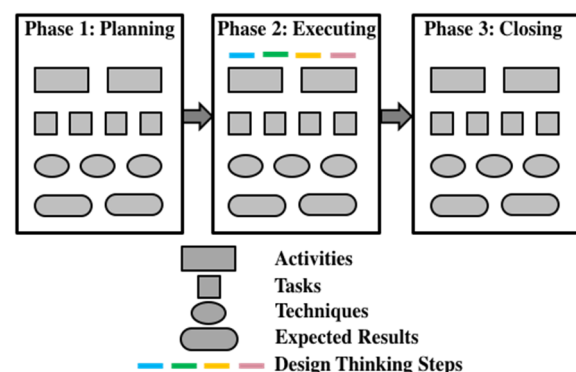


Figure 2: Abstraction of A2BP Method.

The A2BP method has as main input the model of the current business process (*as-is model*). The

main output is a documentation that will support the BPM team responsible to design a new process model (*to-be model*) by using techniques of analytical and intuitive thinking. As intuitive thinking takes into account the outside-in perspective, we consider that the method is more suitable for processes that begin and finish in the customer organization, (i.e. end-to-end process).

Our intention is that business process analysts can use the A2BP independently. However, we believe that the depth and quality of outcomes depend on professional experience. Furthermore, the quantity of techniques and the time required to perform the method will also depend on the size and complexity of the process being analyzed. We emphasize that the main reason to include exploration techniques and practices include the capability to stimulate divergent and convergent thinking to generate ideas to make the business process aligned with customer expectations.

The A2BP method is available on the website (<https://goo.gl/3r1HYW>) to facilitate its application during the empirical study. As exemplified in Figure 3, each step of the method contains activities, tasks, techniques, expected results and a fictitious example to illustrate how to use the techniques. As there are different types of goals to analyze a business

process, the techniques proposed by the method are presented as suggestions to analysts according to the expected results of the tasks to be performed. Exploration techniques are more present in the execution phase because it was organized under the structure of design thinking approach. Thus, it is important to note that the method proposes exploitation or exploration techniques for certain tasks.

In the website of the method, we provide a specific menu that presents the techniques and recommended flow to be followed along the ambidextrous analysis of business process. By clicking on the title of the desired technique, the user is directed to a page, such as in Table 2, that details what is the technique, why to use it, how to use it and the participants who can carry it out.

It is important to note that it is not the scope of this research to investigate what are better techniques for each proposed activity in the method. Just as there are many consolidated exploitation techniques, several exploration techniques have been developed by academia and industry. However, the application of exploration techniques in analyzing and improving business processes is still an emergent theme in literature (Richardson et al., 2013; Luebbe and Weske, 2011).

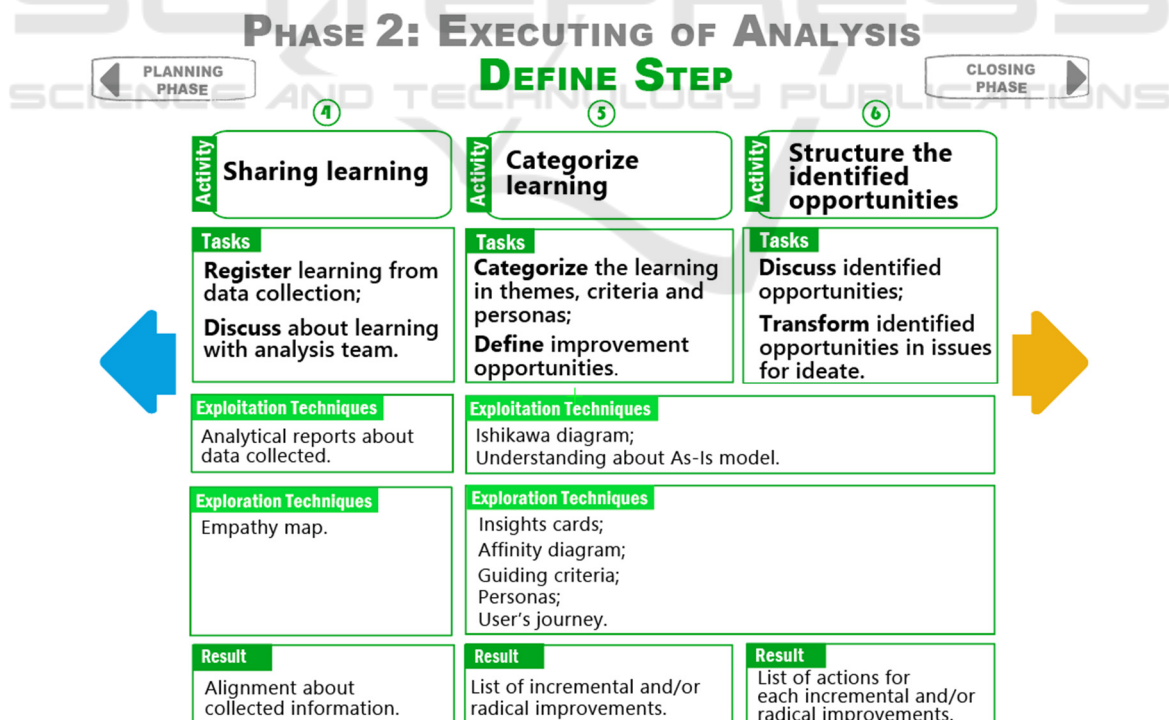


Figure 3: Define step in the realization phase of A2BP.

Table 2: Example of Exploration Technique - User journey.

User Journey Technique	
What	is a visual or graphic interpretation of the overall story from an individual's perspective of their relationship with an organization, process, service, product or brand, over time and across channels.
Why	user journeys are a great way to communicate what you are trying to achieve with stakeholders; can help you work out how users are going to interact with your system and what they expect from it. They help identify possible functionality at a high level – by understanding the key tasks you can start to understand what sort of functional requirements will help enable those tasks.
How	<ol style="list-style-type: none"> 1. Identify the activities and interactions according to the defined personas. In this way, each persona will have his own journey designed in order to create innovative solutions for different points of contact from the point of view of each profile; 2. Evaluate if an idea generated for a persona at a specific point in the journey may be interesting for other personas; 3. Design the user journey according to the personas and all the points of contact they can have with the business process.
Participants	This technique should be performed with the participation of the analysis team. The validation of the information can be done with the actors and clients to verify the adherence of the characteristics and needs described.

According to Rosemann (2014), in the current scenario, process analysts are unaware of the design thinking approach and may never had experience in the use of exploration techniques in the context of BPM. Given the large amount of existing techniques, we suggest 16 exploration techniques so that the understanding and application of the A2BP method does not become over exhausting and complex for the analysts. Otherwise, they would spend a lot of time learning how to use several existing exploration techniques.

In the **empathize step**, the goal is that the analysts learn everything involved in the process. From the customer perspective, it is important to note that the business process begins when he is

deciding which product or service to request. Furthermore, expectations and customer experience about the process that he is demanding are important variables to improve the product and/or service offered. Exploration techniques such as empathy interview and user camera can assist in this regard. Desk research and check sheets are exploitation techniques that support analysts to identify reworks, activities automation alternatives, among other aspects related to existing bottlenecks and problems in the process.

After the analysts have collected data on how the process happens through different perspectives, the **define step** will assist in categorizing these data and lists improvements and actions to be discussed at the ideate step. Thus, analytical reports containing the main problems and bottlenecks related to time, cost and quality are derived from the documents and interviews. Through the support of exploration techniques, such as empathy map, insights cards, personas and user journey, it becomes possible to increase opportunities for improvement throughout the business process. These techniques enable process analysts to look beyond the organizational boundary and explore subjective data.

The discussion of ideas and documentation of how they may be developed are part of the business process analysis. Thus, the **ideate step** is responsible for selecting the best ideas generated according to the feasibility and obstacles. The 5W2H (exploitation technique) is often used to define actions on what will be done in terms of improvement, why, where, when, who, how and how much the implementation of these actions. In parallel, exploration techniques can be used to explore new opportunities and organize them according to the personas identified above, such as brainstorming, brainwriting, menu ideas and positioning matrix.

Finally, the **prototype step** aims to facilitate an initial preview of how the selected ideas can be transformed into a new process model (*to-be model*) to support the final documentation of ambidextrous analysis of business process. It is important to highlight that the prototype step within the analysis phase is characterized differently to the process design, the next phase of the BPM cycle. In the design phase, for example, the analysis documentation will be used to define all the business rules, metrics and more robust simulations. In addition, the *to-be model* should be prepared more accurately and analysts should provide details to represent how the process is going to be performed after its implementation.

Therefore, the goal of the prototype step in the analysis phase is to develop early versions of the business process for quick and minimal test the improvement opportunities identified by analysts, stakeholders and customers. Business process views should be developed through storyboards, paper and screen prototypes or by the process modeling to be presented to stakeholders and collect feedback. The expected final result of the A2BP is the documentation of these prototypes and feedback to assist in the design of the new business process model by using techniques that stimulates the explorative and exploitative thinking.

4 EMPIRICAL STUDY

4.1 Expert Opinion

As described in Section 2, design science research cycle includes the design and evaluation of an artifact that has the theory as a foundation and has a business context for which it should have practical use. After designing the artifact, an expert opinion was held. Briefly, the profile of each participant is described in Table 3.

As the proposed artifact aims to be applied by BPM professionals and organizations that want to analyze and improve their business processes, we invited experts who have experience in business and/or IT with solid knowledge in BPM. Just one expert reported to have participated in a project involving design thinking, but said that his experience in this matter is low. The others only read about it or never had contact. This profile was chosen because it is similar to what is founded in organizations that will apply A2BP method.

The following sections describe the results of the expert opinion survey to answer RQ2. Here we analyzed the expert's perceived ease-of-use and usefulness of the A2BP method.

4.1.1 Perceived Ease-of-Use

The first question addressed the ease of understanding and use of the phases, flow activities and tasks proposed by the A2PB. Four experts said they strongly agree and three marked that agree with the assertion of the first question.

The second question of the survey was open. The experts suggested ways to improve the understanding and execution of the phases, activities and tasks of the method. We present below two

Table 3: Experience of Experts.

Experts	Experience
Expert 1	Has a MSc in BPM, worked as business analyst for 2 years, structuring the BPMP of a public organization.
Expert 2	Has over 10 years of experience in the IT field, is a consultant in management activities, systems analysis, requirements analysis, negotiation and BPM.
Expert 3	Has worked for over 20 years in IT, having worked as Manager, Business Analyst and Data Architect. He is Project Management Professional (PMP) and Certified Business Process Professional (CBPP) and Certified Scrum Master (CSM).
Expert 4	Has 23 years of professional experience in IT and organizational consulting, has experience as BPM analyst in public and private companies. Has a MSc and PhD in the BPM area and owns PMP and CBPP certifications.
Expert 5	Is a master in computer science and works in the implementation of tools for organizational competitiveness and efficiency in the areas of Project Management, BPM, Digital Quality and Audit. It has the PMP and CBPP certifications.
Expert 6	Is a University lecturer and conducts research in the BPM area. Has experience in BPM projects in various companies.
Expert 7	has a MSc in BPM and has experience as consultant and team manager of process analysts in several companies through improvement projects and process automation for nearly 9 years.

recommendations given by experts:

- *“Joining the last two tasks of the activity 2 of empathize step. Place a broader term, something like ‘To plan data collection’”;*
- *“Develop a glossary to explain terms that are not self-explanatory, such as, ‘partial alignment of understanding’”.*

The third question was an assertive on the clear understanding of how to use the exploitation and exploration techniques proposed by the method. As results we had that: one expert does not agree, one was undecided, four agree and one strongly agree that the method provided clear instructions on how to use the exploitation and exploration techniques.

The fourth question asked if the description of the techniques could be improved to facilitate their understanding. The suggestions given by the experts are listed here:

- *“For me, the how to use the techniques is not so didactic. I think it would be interesting to number*

the steps. For a first version, as a whole, the work is very good”;

- *“The method should make explicit who are the mandatory and desirable participants to apply the techniques”.*

The fifth question asked for suggestions of improvements to the method website layout taking into account the colors, fonts, images, layout of text, templates, etc. All the experts who answered this question praised the layout and organization of the site. The only recommendation was to design the website with better look and feel.

4.1.2 Perceived Usefulness

The sixth question asked if the phases, activities and tasks are appropriate to carry out an ambidextrous business analysis process. One expert marked as undecided, five agreed and one strongly agreed with the statement.

The seventh question asked suggestions to increase or change the phases, activities and tasks to make the method more useful for ambidextrous business analysis process. The experts recommended the method should provide more explicit advice on when to use or make optional the execution of any activity, task and/or technique.

The eighth question addresses whether the experts consider the exploitation and exploration techniques appropriate to perform incremental and radical improvements of business processes. One expert was undecided, five agreed and one strongly agreed with the assertion. The ninth question asked for suggestions to experts on the inclusion or exclusion of any technique. There was no suggestion given to this question.

In order to better illustrate how to use the A2BP method, we created a fictitious project of an ambidextrous analysis of a pizzeria business process improvement. In this documentation, users can observe the results of the application of the techniques present in the proposed method. Therefore, the question tenth asked if the pizzeria example helps in use of the techniques. As a result, an expert disagreed, two were undecided and four fully agreed with the assertion. The question eleventh asks for suggestions to improve the pizzeria example. Two suggestions were given to make the example more simple and straightforward.

4.1.3 Expert Experience and Criticisms

In order to understand the perception of experts regarding the proposed method, the final question

asked experts to comment their experience in general. Five experts reported their experiences:

- *“I think it's a rich experience by using creative techniques”;*
- *“I agree that it is interesting, certainly putting it to test on a real project, I believe that the results would be very interesting”;*
- *“I found quite interesting, but seemed a little 'heavy' if considered at all steps / techniques”;*
- *“I found it interesting and curious because I saw the junction of several good practices”;*
- *“I had a very good experience. The use of exploration techniques stimulates us to think beyond what we are used to”.*

Finally, we also asked how the method could be improved. Experts suggested the following improvements:

- *“Develop an explanatory video about the method in general”;*
- *“Experience report about the difficulties and facilities found in the use of the method”;*
- *“A model of evaluation with indicators established to monitor the adherence of the method”.*

4.1.4 Method Refinement

According to the DSR (Hevner et al., 2004), after conducting the first cycle of empirical evaluation, we must refine the method artifact. The following feedbacks from experts were taken into account to improve our A2BP method:

1. We adjusted the nomenclature of some tasks to facilitate understanding;
2. We integrated some tasks that have similar results;
3. We developed a glossary to explain terms that are not self-explanatory;
4. We improved the images of some techniques;
5. We developed a video that contextualizes the method in general.

4.2 Observational Case Study

After refining and improving the A2BP method with feedback from experts, as discussed in previous section, we carried out a case study to evaluate the applicability of our method in an organization with experience in BPM. The case study was conducted between July and October 2016. The following section describes the organization in which the method was applied. Then, we also evaluated the method by means of the perceived ease-of-use and usefulness, as well as suggestions and critics of the participants.

4.2.1 Case Description

The organization chosen to implement the A2BP Method has the function of assisting the Legislative in the external control of the Public Administration. It performs the monitoring and auditing of public accounts. Because the method is suitable for business processes that start and end on the customer, we chose the complaint process. This process aims to investigate information about irregularities in the administrative, financial, budgetary and balance of government agencies, including indirect administration or those who executed any public expenditure.

The complaint process has the following phases: formalization, investigation, judgment and publication. Initially, the citizen delivers a petition to the protocol sector. It can be an individual or legal person. Then, the admissibility requirements are checked and the protocol sector forwards it to the counselor to authorize the formalization of the process. To be formalized, the process goes to the investigation to audit.

The auditor writes a report with the outcome of the investigation confirming or rejecting the facts alleged by the complainant. Concluded the case to judgment, the counselor's office provides the preparation of the vote and submit the case to judgment by the collegiate based on the audit report. Following the decision, the process proceeds to the implementation of the resolutions included in the decision and its result is published in the official journal of the State.

As described in Section 4, the application of the A2BP method has as input the as-is process model. The participants of the case study were a BPM team of the case organization comprised of one manager and two process analysts. During the case study one researcher participated as observer of all activities conducted by the team to apply the A2BP method.

To start the study, the team created the as-is model of the complaint process by obtaining information through interviews with three staff responsible for the formalization phase, six staff of the investigation, three staff involved in the judgment and two in the publication. In total, fourteen interviews were carried out to create the as-is model.

With the input of the as-is model of the complaint process, the case study began with the activities of A2BP method **planning phase**. Initially the team collected information related to the complaint process through the exploitation technique of desk research. Among some documents searched,

are the Organic Law No. 12,600 of 2004 and Resolution 008/2006 regarding the complaint process.

To establish the scope of the analysis, the team invited three stakeholders responsible for the complaint process who had roles of managers of their functional areas. The team presented the as-is model to stakeholders. They discussed problems and opportunities with the brainstorming technique. After the meeting, two Improvement Opportunities (IO) to be explored during the analysis:

- IO1: there are two procedural rules that do the same activities and are handled differently (special audit and complaint). That causes rework and waste of time;
- IO2: complainants write information on the application form in very different manners. This causes confusion and delays in the complaint formalization sector.

Based on that, the first version of the analysis plan was drawn up containing the main activities to be carried along with a schedule. Then the team started the **executing phase** of A2BP method comprises the steps of empathize, define, ideate and prototype. During the **empathize step** the team carried out a review of the complaint process (Activity 1) and conducted a preparation to learn with the actors and customers of the complaint process (Activity 2).

Activity 3 of the empathize step includes learning more about the as-is process. Therefore, the team conducted empathy interviews with a customer and two employees of the protocol sector, who are responsible to receive the petition with the complainant (i.e. the customer of the process). Through the technique of empathy interview, the team identified that the customer does not receive any estimate of when the facts will be investigated. After entering the complaint letter, the complainant receives a protocol number to track its progress through the organization's website. However, from the period when he enters the petition until its formalization, the complainant does not receive any information about the progress of his request. Thus, beyond the two problems identified in the planning phase, the team included another Improvement Opportunity:

- IO3: the complainant cannot follow the progress of his denunciation until it is formalized.

The team noted this problem causes customer frustration due to the lack of process visibility. It is also evidence that the organization is not taking into account customer satisfaction. After the empathy interviews, the **define step** started. In Activity 4, the team shared what they learned about the IO of the

complaint process. They reported the interviews and filled the empathy map (explorative technique).

Then, the Activities 5 and 6 were performed to categorize these learnings and to structure opportunities identified. At that moment, the team used the ishikawa diagram (exploitation technique) as well as insights cards, affinity diagram, and user journey (exploration technique). During this step, the team categorized three new Improvement Opportunities for the process, such as:

- IO4: a guideline on how to write a complaint is not available for customers;
- IO5: there are no standard procedures for the auditors on how to formalize petitions as a complaint;
- IO6: the information on the organization's website regarding the reports of each sector is not easy to understand for the customer because they contain many acronyms and jargons used internally by the organization.

Considering the six Improvement Opportunities identified by analysis team, four were prioritized to be further analyzed in the **ideate step**. The prioritized IO were: IO1, IO2, IO3, IO4. For each IO, several ideas were generated (Activity 7) and refined (Activity 8) by using 5W2H (exploitation technique) and brainstorming (exploration technique).

After the team carried out discussions and documented the ideas generated, in the **prototype step**, they prototyped possible solutions for each IO according to the Activities 9 and 10 of the A2BP method. For IO1, the team investigated how other similar organizations handle modalities of different processes as a unique process. The team noted that it would be feasible to implement this solution. For IO2, a new version of the application form has been generated in order to standardize all data concerning the complaint process.

Regarding IO3, the idea chosen for prototyping was to improve the traceability of the process through notifications to the complainant whenever their complaint letter change status within the organization. This notification can be received by SMS and/or e-mail according to customer choice. To contemplate the IO4, the team decided to provide guidelines at the organization's website on how to fill in the complaint letter to avoid misunderstanding and disagreements.

Finally, the team refined all the documentation generated during the analysis of the complaint process using the A2BP method. A meeting was held with stakeholders in order to present the results of the analysis. After the **closing phase**, the application of A2BP method was completed and the team conducted discussions about the design of the to-be model of the complaint process.

After application of the A2BP method, a semi-structured questionnaire was conducted with the analysis team and the BPMO manager to assess the perceived ease-of-use and usefulness, experience of use and criticism of the method. Four participants answered the questionnaire. These results are presented in the following sections.

4.2.2 Perceived Ease-of-Use

The first question addressed the ease of understanding and use of the phases, flow activities and tasks proposed. One participant said he was undecided, two partially agreed and strongly agreed that the method was easy to use. The second question asked for suggestions to facilitate the understanding of the phases, activities and tasks of the method. Two participants gave their opinions:

- *"The method could make it clear that it is intended to be used integrated with the existing BPM methodology of the organization";*
- *"It was not clear for me if I could perform again, the activities already done".*

The third question was an assertion on the clear understanding of how to use the exploitation and exploration techniques suggested in the method. One participant disagreed, two partially agreed and one strongly agreed that it was clear on how to use the techniques. In the fourth question, it was asked how the description of the techniques could be improved to facilitate their understanding. The suggestions are listed below:

- *"The templates of the techniques available were not fully used because they do not look good when printed";*
- *"The sequence of exploration techniques was not clear when the technique was required or optional".*

There was no answer to the fifth question, which asked if they have suggestions for improvement in the website layout of the A2BP method. Two participants praised the website layout.

4.2.3 Perceived Usefulness

The sixth question asked if the phases, activities and tasks are appropriate to carry out an ambidextrous business analysis process. One participant marked as undecided and three agreed with the statement. The seventh question asked for suggestions to make the method more useful, but there was no answer to that question.

The eighth question addressed whether the case study participants consider the exploitation and exploration techniques appropriate to perform

incremental and radical improvements in the business processes of the organization. One participant was undecided, two agreed and one strongly agreed with the assertion. The ninth question asked for suggestions on the inclusion or exclusion of any technique. One participant suggested the method should include fewer exploration techniques.

The tenth question asked if the example of the pizzeria process helped in the learning on how to use the techniques. As a result, one participant did not agree, two agreed and one strongly agreed with the statement. In question eleventh, the only suggested improvement was to improve the details of the results of the planning phase.

4.2.4 User Experience and Criticisms

In order to understand the experience of the participants on the use of the proposed method, the last question asked how was their experience in general. The participants evaluated the method positively:

- *“Overall, the experience was very enriching. I believe that using the method can bring a gain for the organization, mainly by combining techniques that make us stop to think and act not only mechanically”;*
- *“I can say I learned innovative ways to analyze a process. The idea of mapping for empathy, personas, and user journey are important to know how the idea of improvement is accepted or not by the people who actually are working on the process daily”;*
- *“For me it was very good. I felt a good organization and focus to understand, analyze and improve process.”.*

4.2.5 Method Refinement

The following feedbacks from participants of the case study were taken into account to improve our A2BP method:

1. In the description of the method, we should make more explicit that it contemplates only the analysis phase of the BPM lifecycle;
2. We adjusted the templates of the techniques that had problems of understanding and visualization;
3. We described in the method that exploitative and exploratory techniques are all desirable and their application depends on the context and nature of the business process to be improved.

After performing these refinements, we will be able to continue the DSR cycle to further improve our proposed artifact – the A2BP method.

5 CONCLUSIONS

In this paper, we investigated organizational ambidexterity and design thinking practices during the phase of business process analysis. By adopting a design science research approach, we proposed a new method to support the ambidextrous analysis of business processes, called A2BP method. The method proposes a novel way to analyze business processes by means of explorative and exploitative techniques.

We also conducted empirical studies by means of expert review and observational case study to evaluate the method proposed. Both studies evaluated the perceived usefulness, ease-of-use and obtained suggestions and criticisms to improve the method. In particular, the purpose of expert opinion was to achieve a first round of refinement of the method. According to their experience, experts envisioned how to apply the method in their own contexts. Then, with the case study we were able to verify the method’s applicability in a real BPM initiative. We observed the difficulties experienced by the participants and collected new opportunities for improving the method.

According to the results of the empirical studies, we perceived that both experts and participants of the case study assessed the A2BP method as easy-of-use and useful to exploit internal problems and explore external opportunities. In the case study, six Improvement Opportunities were discovered. Of which, four IO were problems identified internally and two IO emerged based on the interactions with the customer of the complaint process through the use of exploratory techniques.

According to the case study participants, probably these two IOs would not be identified if the team used only traditional exploitation techniques for business process analysis. Therefore, we conclude that the exploration techniques proposed by the A2BP method enriched the analysis of the complaint process. As practical contribution, the A2BP method is available for organizations conducting BPM initiatives that aim to explore innovative ways to continuously improve their business processes.

Despite the methodological rigor adopted in our research method, our empirical studies face some limitations. The main limitation is related to a low

generalization of results because we applied the method in only one BPM project at the case organization. Another limitation lies in the nature of expert opinion survey that our findings are based on the perception of only a limited number of participants.

As future work, we propose to apply the A2BP method in several different contexts and business processes. Furthermore, we suggest the conduction of a quasi-experiment in order to compare the analysis results with and without A2BP method.

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