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BPPAM tool: A Business Process Framework

Paula Ventura Martins[a,b]* , Marielba Zacarias[a,b]

[a]*Research Centre of Spatial and Organizational Dynamics, Universidade do Algarve, Faro 8005-139, Portugal*
[b]*Faculdade de Ciências e Tecnologia, Universidade do Algarve, Faro 8005-139, Portugal*

Abstract

Current business process modeling methodologies offer little guidance regarding how to discover and maintain business process models aligned with their actual execution. We argue that business processes should emerge and evolve collaboratively within an organization. In this article we present a business process and practice authoring tool based on our vision for business process improvement.

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1. Introduction

Business Process Modelling (BPM) specializes on describing how activities interact and relate with each other, and how activities interact with other business concepts such as goals and resources, where resources may be material and informational entities, as well as human or automated actors. Current BPM methodologies are supported by data collection techniques including interviews, surveys, text/document analysis, among others. BPM emphasizes process notions (workflow, decision, information, activities) as the dominant dimension [1]. However, BPM would benefit from a better understanding of other elements that contribute to process execution such as people and human interactions, products or tools used, specific vocabularies, preferences, habits and rules.

* Corresponding author. Tel.: +351 289 800 900; fax: +0-000-000-0000 .
E-mail address: pventura@ualg.pt

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Moreover, it has been argued that existing BPM methodologies offer little guidance in keeping up-to-date the continuously evolving knowledge coming from business process execution [2]. Business processes are executed through human and automated activities. Whereas many business processes are fairly static only at a high level, at finer-grained levels such as activities, are more agile and unpredictable. Indeed, many organizations do not know their end-to-end processes accurately or in detail, since the knowledge required for its execution is tacit and decentralized [3]. Recent research in BPM is aiming to address the unpredictability of business processes [4, 5], but there is yet little help in addressing the problem of tacit knowledge and business process model maintenance.

From our point of view, what appears to be unpredictable behavior does not mean chaos. Indeed, it follows certain rules. The rules followed in the execution of activities and tasks can be uncovered by capturing work practices. Work practice is a concept that originates in socio-technical systems, business anthropology, work systems design, and management science [6]. Work practices are behaviors of specific individuals, performing specific activities, in specific circumstances, exhibited as action patterns. Work practices involve people engaging in activities over time, not only with each other, but also with machines, tools, documents, and other artifacts. The importance of discovering work practices to improve user support has been acknowledged in [6, 7]. Work practice modeling is also important in (1) providing a deeper understanding of the human activities composing business processes, and (2) assessing the alignment between process models and actual execution [8].

We argue in our research that the emphasis in Business Process Improvement (BPI) should be stressed on communication, coordination, and collaboration within and among team members in daily work activities, and consequently the effort in business process improvement should be minimized and performed as natural as possible. Business Process and Practice Alignment Methodology (BPPAM) represents a multidisciplinary approach that allow business analysts to discover, supervise, analyze and improve business processes, paying attention not only to the process dimension but also to product, information and human dimensions that become visible in actual work practices.

Little attention had been paid to the effective implementation of BPI models which has resulted in limited success for many programs. Business analysts want guidance on how to implement BPI activities, rather than what BPI activities do actually implement. Limited research has been carried out on exploring new approaches to effectively implement BPI programs. On this basis, we propose a new methodology, and a complementary tool, to describe and improve business process based on daily experience in organizations.

This paper is focused on the description of the BPPAM framework, which is a Web based tool for process and practice definition. Section 2 presents an overview of BPPAM tool, in particular gives an overview of the set of tools that together compose the BPPAM framework. Section 3 describes how BPPAM and BPPAM framework are combined to work together in order to support business process improvement. Finally, section 4 presents related work of other initiatives and section 5 concludes this work, justifying our perception that this proposal has innovative contributions for the community.

2. BPPAM tool

BPPAM is an investigation initiative that reflects on problematic of Business Process Improvement and it has the main goal to analyze, integrate and support best practices for managing and implementing Business Process. The initial definition of the initiative considered a set of guiding principles linked to business processes, namely: daily practices and business processes alignment; operational and analysts' involvement; facilitate communication based in visual models and finally, simplicity at all levels.

The underlying investigation to this initiative has been rendered and validated with two complementary sub-phases to accomplish the discovery phase of BPPAM: Learning Business and Modelling Business. The outcome of the Learning Business is preliminary descriptions of both work practices and business processes. The sub-phase Modelling Business, involves several stakeholders (business analyst, process owner, organizational unit responsible and operational actors) that perform interrelated activities to produce business process models based on previously identified best practices. The tool described in this paper addresses many of the major research issues related with Learning Business, namely: daily practices definition, context definition and process-practice alignment. The BPPAM tool intends to support mechanisms developed through this research in order to allow organizations to improve their business processes.

3. BPPAM methodology

Business Process and Practice Alignment Methodology (BPPAM) in systems engineering is an approach to represent processes of an enterprise, so that the current process may be analyzed and improved. BPPAM proposes a two-dimensional approach, encompassing three phases: (1) Business Process Discovery, (2) Business Process Supervision and (3) Business Process Assessment and Improvement. Business Process Discovery provides an initial process specification through interviews and collaborative methods. Business Process Supervision assures that daily practices follow base business process models. Business Process Assessment and Improvement allows analyzing performance measures to improve and refine business process models.

Each phase integrates two dimensions: (1) Process and (2) Practice. The Practice dimension explores day-to-day work based on individual actions and practices. This dimension captures and represents on-site information needed to systematically validate business process models, eliciting the knowledge of operational actors (represented by individuals or groups). At this level, knowledge is local and frequently tacit, thus it is hard to formalize. However, it encompasses information needed to validate process execution. In the Process dimension, business analysts discover, review and improve business process descriptions, based on information from the Practice dimension. The process dimension addresses knowledge that crosses functional divisions and organizational boundaries (clients, suppliers). Therefore, it is not confined to particular individuals or groups. The process dimension also addresses the need of continuous business process supervision and improvement as a reaction to fast-changing environments. These two dimensions, Practice and Process, will ensure the proper structure to articulate individual, group and organizational knowledge with the knowledge of business analysts.

In this section we introduce the functionalities of the BPPAM tool that are related with the first phase (Business Process Discovery) of the methodology. Our approach is to describe the activities and roles involved in each one of the sub-phases.

3.1. Business Process Discovery

The main goal of a Business Process Discovery (BPD) is to get personal descriptions of business processes from work practice descriptions. BPD phase aims at developing an organizational profile of people, activities, technology, and information in order to capture actual business processes. This phase includes two main sub-phases: (1) Learning (Eliciting) Business (LB) and (2) Modeling Business (MB).

3.1.1. Learning Business

The Learning Business sub-phase encompasses three activities; (1) kickoff meeting, (2) eliciting information of practice and process, and (3) elaborating preliminary practice and process descriptions. The kickoff meeting communicates operational actors the goal and procedures of the BPD phase. Information elicitation is accomplished according to the nature of each dimension.

Initially, the sub-phase Learning Business includes interviews where the business analyst interacts with operational actors as key to the success of business discovery. At an organizational level, the methodology proposes to assist organizations in their effort to assess and manage problematic situations based on daily actions and implement solutions related to these problems.

The BPPAM methodology was designed for explicitly addressing the social dynamics of business process specification. It is based on social interactions as proposed in a two-dimensional space. The Practice dimension covers information needed to systematically support or reject many process decisions based on the result of daily experiences. The exact process representation concerns activities, resources, decision points and work flows (topology). In the Process dimension, business analysts capture best practices from the practice dimension that leads to business process description. The dynamic interplay between these two dimensions (practice and process dimensions) shows the synergy between activities performed by key operational actors and activities described by business analysts involved in Business Process Discovery. In BPPAM there are several roles that represent the different responsibilities, which occur during learning business process (see Table 1). The outcome of this sub-phase

is preliminary descriptions of both work practices and business processes.

Table 1 Learning Business Process Roles

Role	Responsibility
Business analyst	Responsible for operational actors relationship and learning business process features
Operational actors	Responsible for reporting their daily actions and determining the priority of business process

Practice Dimension. In our framework, work practices are defined in terms of action patterns, that is, recurrent action sequences. Due to its local nature, work practices vary according the context of execution. Moreover, operational actors are often unaware of their recurrent action patterns. Hence, instead of conducting standard interviews and workshops, the approach to elicit work practices is accomplished as follows: (1) Capturing daily actions, (2) Identifying action and interaction contexts created by related actions, and (3) discovering recurrent action patterns within contexts.

The BPPAM tool includes a set of functionalities that allows to create, update, delete and consult daily actions perform by different actors. Capturing daily actions (figure 1) creates action repositories, where each action is registered as <*actor, actions, resource*> triples. Actions refer to fined-grained operations of actors' daily work. Actions are identified with verbs taken from the vocabulary shared among operational actors. Resources may involve information, tools, materials or even human knowledge not yet externalized in external sources. Resources are described with nouns or nominal phrases using actors' own vocabulary. Actions may be communicative or not communicative. Communicative actions involve two actors; a sender and a receiver.

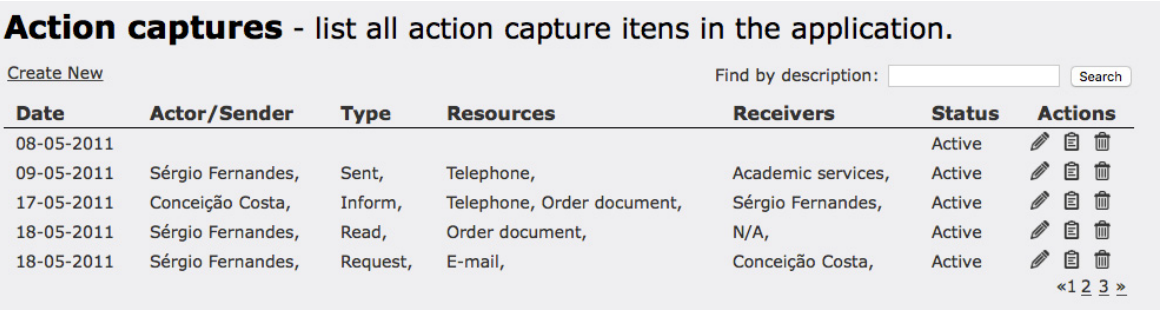

Figure 1. Action captures performed by operational actors

Understanding the meaning of actions requires situating them in a particular context. Drawing from the sociological notion of context, **action contexts** are defined as situations created by action sequences performed by one or more operational actors. Action sequences performed by a single individual create **personal action contexts**. Interaction sequences i.e. communicative actions exchanged between two or more actors that are part of a single conversation, create **interaction contexts**. Under this definition, action and interaction contexts are uncovered by grouping sequences of actions related to a given situation. Once identified, contexts are analyzed in order to discover recurrent action patterns within them (figure 2). It is noteworthy that action and interaction contexts and patterns are not generic. Rather they refer to specific persons, places a time period.

The BPPAM tool provides a set of functionalities to the business analyst in order to identify and improve contexts. Figure 2 presents the edition of a context and allows to identify sequences of actions related to that situation.

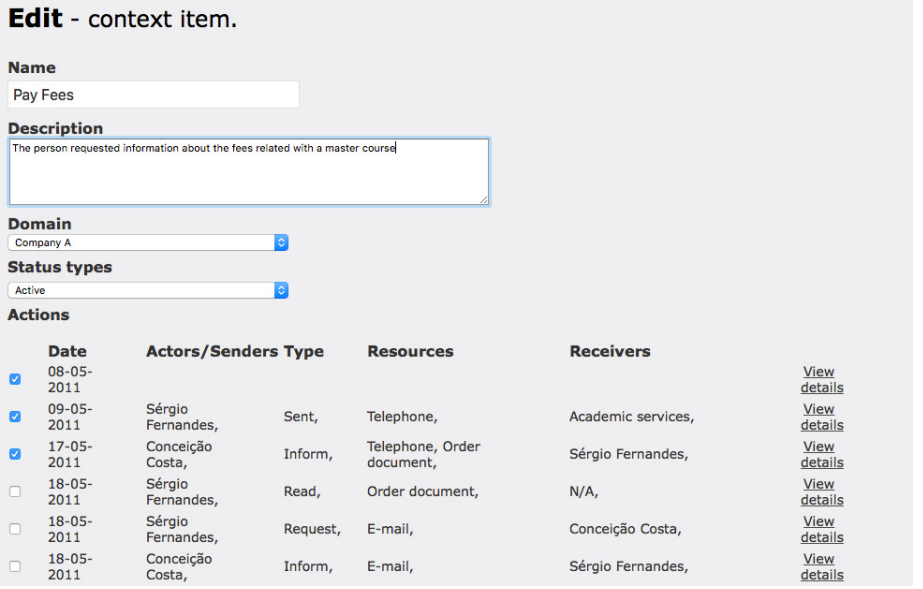

Figure 2. Context definition by business analysts

Process Dimension. The action patterns discovered at the practice dimension are then analyzed and discussed by operational actors and business analysts in order to define business processes, as well as the business activities and resources, composing business processes (figure 3). This discussion entails an aggregation process that is accomplished in a bottom-up fashion. However, a top-down application of high-level knowledge such as organizational goals and strategies is required to complete business process definitions.

Figure 3 represents the definition of a new business process activity based on the information by the practice dimension. The new activity is related with two different contexts. Then, these new business activities and resources will be analyzed at the process dimension as candidates for future improvements in a base process. This phase follows a pattern of cyclic iterations that allows detecting and validating new business practices. The tool also includes functionalities to create, update, delete and consult business processes.

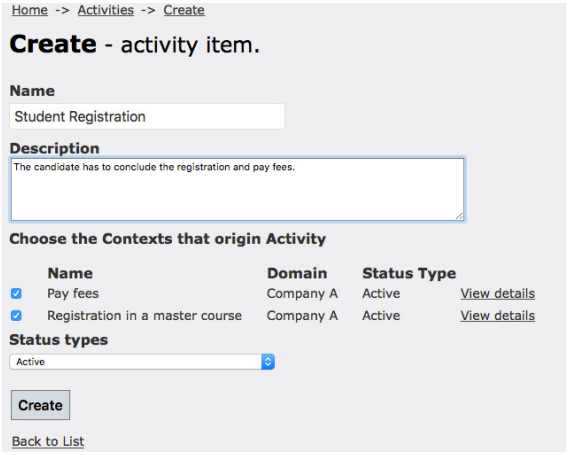

Figure 3. Process definition

3.1.2. Modelling Business

After an initial business process definition, business analyst starts modelling business processes. The sub-phase Modelling Business, from the knowledge management point of view, involves several stakeholders (business analyst, process owner, organizational unit responsible and operational actors) into three interrelated activities: (1) model construction; (2) model revision and evaluation and (3) model approval. These activities support a negotiation process that if successful, results in a shared view of the process. Finally, the model approval activity concludes when the participants approve or reject the model.

All participants may present alternative proposals that result from associating different facts and new meanings. The updating process provides support to business process model discussions and negotiations to correct represented activities and other aspects. Finally, the model approval activity concludes the interaction process and collaboration among the parties involved in a business process model specification by approving or rejecting the model. At the process level, model revision and evaluation activity uses the annotation as a mechanism to capture the update proposals made by business actors. Annotations are used mainly to make proposals to correct the model (corrective maintenance), to capture changes in action or interaction contexts (adaptive maintenance), to make free comments that could anticipate problems (preventive maintenance) and promote continuous process improvement (perfective maintenance). If business actors detect any misalignment between the model and their knowledge of activity current states-of-affairs, they can make a textual or graphic annotation with the correction proposal.

Business process modelling aims to describe the actually performed business process, the models are used as the basis for understanding and analysing processes, improving existing processes, as a baseline for process changes or for disseminating process knowledge. Nevertheless, existing meta-modelling approaches don't cover aspects related to daily actions and also do not solve the gap regarding how to use elements from daily practices (practice dimension) to create business process elements (process dimension). BPPAM meta-model that has three layers: service layer, structure layer and action layer. Each layer is focused on a specific set of concerns and encompasses several elements that describe the concerns of the layer.

Both dimensions (practice and process) involve the same actors (business analyst, organizational unit responsible, process owner and operational actors). Whereas both dimensions involve the same actors, the modeling techniques employed vary substantively according the dimension. The meta-model of the structure layer (figure 4) will be applied to model business processes and the meta-model of the action layer (figure 5) will be used to create daily practice models.

Process Dimension. The process representation concerns activities, products, roles, decision points and work flows (topology). In the Process dimension, business analysts use the best practices that lead to business process reviews and improvement. Business analysts then define business process models based on previously identified best practices applying the meta-model of the structure layer (figure 4).

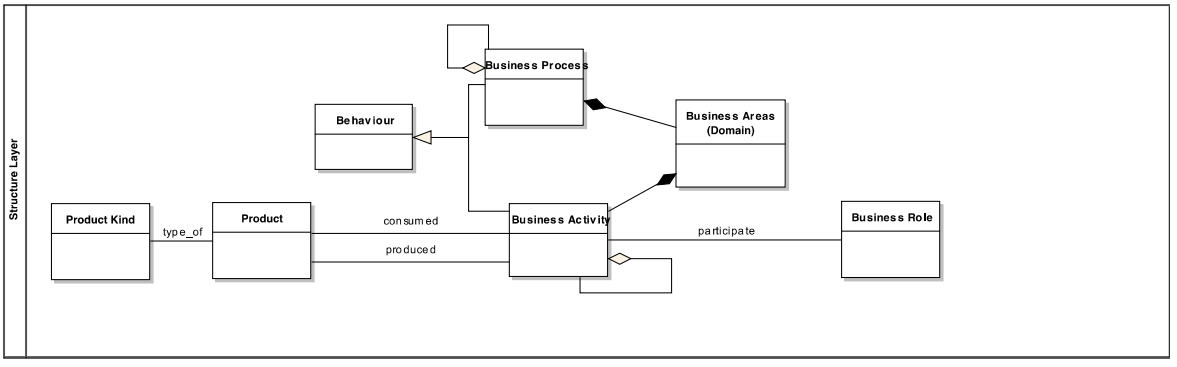

Figure 4. Structured layer of the BPPAMeta-model

Practice Dimension. The action and patterns identified within particular contexts in the previous phase are shared, discussed among operational actors and business analysts involved in similar activities in order to identify which practices yield better results. Figure 5 proposes an extension to the meta-model concerning work practice expressed in terms of entities and the relationships among them.

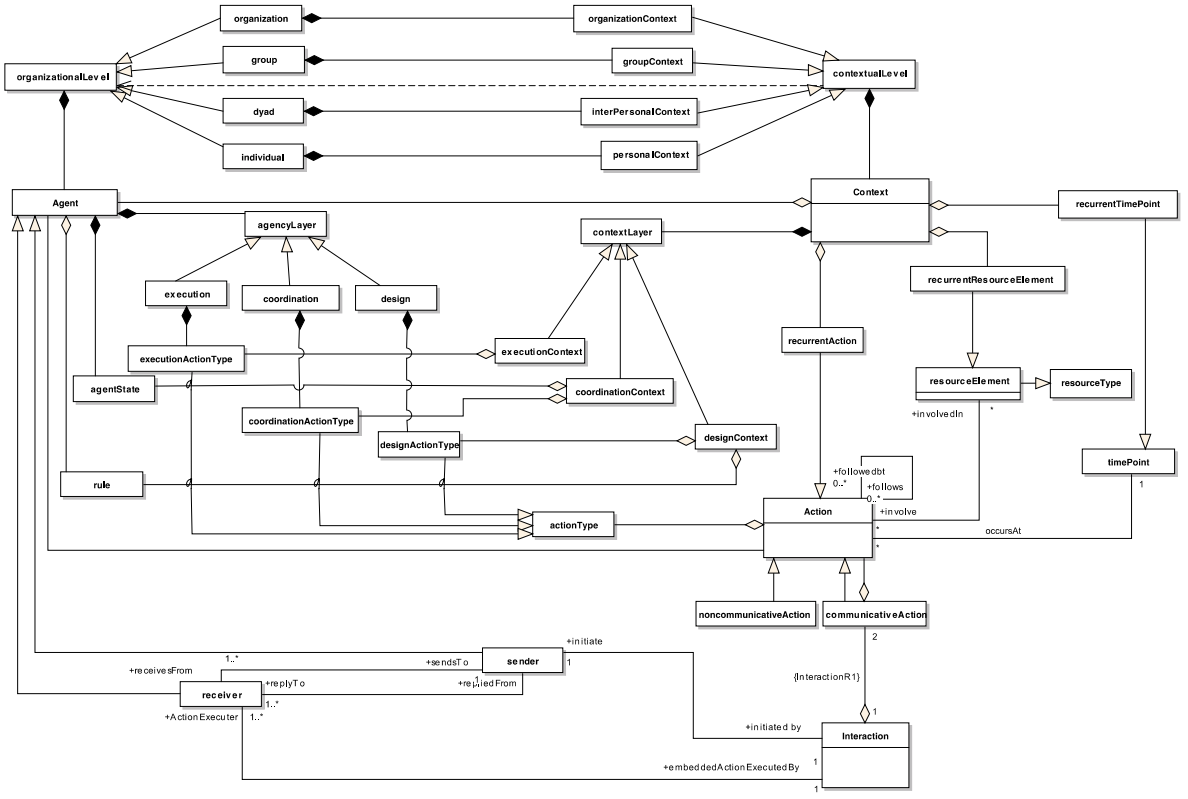

Figure 5. Action layer of the BPPAMeta-model

4. Related Work

The idea of implementing a Business tool, throughout the entire life cycle is not new. Some of the most popular Business Process tools are: Activiti BPM Platform [9], Altova UModel [10], ARIS Express [11] and Bonita BPM [12]. However, many of these tools follow a traditional business process principle, where processes are modeled, simulated and executed. It is a single directional form of communication, contradictory to principles presented in BPPAM. Our approach includes specification and modeling of daily practices by operational actors in order to improve/specify business processes.

On analyzed BP tools, the collaboration with operational actors to create the action repository is not supported. The four tools only allow the specification from scratch of business processes without previous model representation of daily actions. Following the principles of the methodology, BPPAM adopts a bi-directional form of communication, between process team and business team. The lack of alignment between business process descriptions and daily actions results from outdated processes and failure in detecting actions changes to improve processes. The main difference between BPPAM tool and other evaluated tools relays on the strong concept of "process and practice alignment". Changes are detected in daily practices and previously are propagated to process descriptions creating a new process version. Actually, the tool only supports daily practices, contexts and process definition. More features need to be included in the near future, particularly a business process version management

infrastructure to evaluate business process improvement success.

5. Conclusions and Future Work

In this paper we introduce the BPPAM methodology, its main issues and challenges, and the importance of a collaborative tool for BPI. In order to validate proposed ideas and contributions, we decide to develop an environment, called BPPAM tool. Driven by the decentralized, tacit and dynamic nature of business processes, this paper illustrates the application of the BPPAM tool in business process discovery and modelling. The operational actors introduced the details of the actions where they were involved. The business analyst and process owner use the information in the repository to identify contexts and discover business processes.

Results achieved until now show that it is possible to specify business processes based on daily practices in a more productive way, by adapting and integrating techniques such as modelling and models transformation. More extensive case studies encompassing the whole methodology and supporting tool, provided with formal evaluation techniques are required in order to show not only how to discover, but also how to supervise the alignment between existing business process models and work practices. As opposite to evaluated tools, where processes are designed without previous description and modelling of daily practices. In order to react to an industry that requires agility, quality and efficiency, it is imperative to create tools that provide a collaborative approach. In conclusion, we believe that business process tools should move towards a new direction that includes deeper interaction between operational actors and process teams in order to create and to improve business processes.

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