Towards Supporting Business Process Compliance with Policies

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Abstract. This paper discusses early findings of the research in progress to create an approach to support an organization in bridging the gap between existing business processes and policies. Business processes are valuable assets of any organization, and business process modelling has become the key activity for capturing and analysing business processes. However, advances in technology, growing expectation of openness by research funders, competition, regulations in IT security and privacy, and overall economic situation facilitate emergence of new policies, and urge enterprises to change their business processes to be compliant with the new requirements. The goal of the research is to propose the approach for closing the gap between business process models and legal states of business objects described in policies by means of using Bunge-Wand-Weber model. The approach includes means for explicit definition of legal and illegal state spaces of business objects in (1) policies, and (2) as-is business process models, and compliance checking between state spaces of (1) and (2) to indicate the gap. It is an initial input for building to-be business process models that are complaint with newly imposed policies. As a running example to illustrate the approach a publishing business process of a scholar journal is used. New policies from research funders require Open Access (OA) to all outputs from publicly-funded research, and business processes of publishing scholar journals require changes.

Keywords: Business process modelling, BWW model, BPMN, States, Compliance.

1 Introduction

Business processes are valuable assets of any organization. In organizations business process modelling has become the main activity for capturing, analysing, and improving business processes. At the same time there is an increased pressure on organizations to guarantee compliance of their business processes with various legislative and regulatory requirements, other externally imposed constraints, and other policies [1] (further in the text – policies). One domain where new policies are actively adopted is research; e.g., Open Access and Open Data policies (further in the text – OA policies) are introduced to facilitate the transition to Open Science. In the EU member countries introduction of OA policies are mainly based on the European Commission's Recommendation to Member States of July 2012 that they develop and implement

policies to ensure OA to all outputs from publicly-funded research [2]. As a result funders and research institutions have introduced new expectations and requirements, and organisations (e.g., scholar publishers) must have in place services and resources to allow compliance with funder policies [3]. According to [4] academic community will experience rapid changes in the way research is conducted, published, and results are shared. Both policies to enable OA to publications and, more recently, to research data are commonplace at European universities and around the globe, however there are other ingredients to Open Science: such as Open Reviewing and Open Software [4]. Based on that it can be predicted that new policies facilitating Open Science will be introduced in the near future, e.g., as Open Research Data pilot was introduced in Horizon 2020 [5], and organizations will have to provide compliance by introducing changes to the existing business processes.

On the other hand, nowadays organizations employ industry modelling standards like Business Process Model and Notation (BPMN) and ArchiMate to understand and improve business processes. BPMN is the de-facto standard for representing in a very expressive graphical way the processes occurring in virtually every kind of organizations [6]. However, BPMN has its limitations when it comes to modelling other aspects of organizations such as organizational structure and roles, functional breakdowns, data, strategy, business rules, and technical systems [7]. Information about Enterprise Architecture (EA) is needed to create real-world business process models. To provide a uniform representation for diagrams that describe EA, ArchiMate modelling language has been developed [8]. The core of ArchiMate language consists of three main types of elements: active structure elements (subjects), behaviour elements, and passive structure elements (objects).

Business process modelling comprises two aspects – the control-flow perspective and data-flow perspective [9]. Control-flow perspective defines possible execution paths of a business process, while data-flow perspective represents how business objects are manipulated and change states during a process. Control flow perspective is represented in business process models using BPMN. Data in business process models are usually declared in terms of business objects (physical or virtual). Business objects and subjects are represented in EA models using ArchiMate (active and passive structure). Policies impose legal (further in the text also lawful) states of business objects. The previous research has shown that BPMN lack in ability to describe flow of business objects in business process models, and explicitly declare states of business objects and state transition laws imposed by regulations (see [10], [11], and [12]). This gap hinders compliance of business processes with policies because lawful and unlawful states of business objects are not explicitly defined in business process models, models might contain meaningless states, since a set of conceivable states is not depicted, and, as the result, business process models do not represent real-world processes and can lead to business process incompliance with policies. Also, since BPMN proclaims to be directly executable, omitting states and state transition laws may hinder correct automated execution.

The goal of this research is to propose an approach to support organizations in checking compliance of existing business processes against new policies by means of Bunge-Wand-Weber model. Wand and Weber [13] built a set of models for the evaluation of modelling techniques based on an upper ontology defined by Bunge [14]. They extended Bunge's ontology and applied it to the modelling of information systems

(BWW model). BWW model consists of constructs present in the real world that must be represented in information systems. BWW model allows straightforwardly addressing (further in the text BWW elements are in italics): (1) *states* of *things*, (2*) lawful state space* and *lawful event space* of *things*, (3) *conceivable state space* and *conceivable event space* of *things*, (4) *state law* that restricts values of the properties of *things* to a lawful subset, and (5) *lawful transformations* that define which events in *things* are lawful. BWW model provides an explicit representation of business objects, states of business objects, and state transition laws, and allows to monitor whether a business object has assumed an unlawful state. That is the reason why in this research the BWW model is used as a framework to represent in a structured way the policy and the business process for canonical comparison of both to indicate the existing gaps between the process and the policy.

Monitoring states of business objects in business processes against policies: (1) can assist organization in compliance to ensure that organization will not violate laws and there will be no potential legal problems for the organization, and (2) can contribute to consistency in collaborative business processes and customer satisfaction. A number of studies exist that show the importance of addressing states of business objects in business process models, e.g., in [15] authors indicate the importance of object states in large engineering processes such as assembling of a car or an airplane, and according to [16] in order to achieve safe execution of a process model it must be ensured that every time a task attempts to access a business object, the object is in a certain expected state (legal state). And, since not all possible transitions of states are meaningful, restrictions on object state transitions are also required. In this paper the author intentionally uses the term “business objects” and not “data objects”, since active structure elements (such as actors or application components) are also capable of assuming a state which can be illegal and should be also monitored.

The research methodology is a design science method using deductive research approach. The validation of the proposed solution is out of the scope of this paper. It will be conducted using Delphi estimation method combining expert judgement. Delphi estimation will include individual estimates, sharing the estimates with experts, and having several rounds until consensus is reached.

The paper is structured as follows. In Section 2 the related work is outlined. In Section 3 the proposed approach is described. The example of applying the proposed approach is outlined in Section 4. Brief conclusions are presented in Section 5.

2 Related Works

The lack of consistent theoretical foundation for building information systems urged Wand and Weber to build a set of models for the evaluation of modelling techniques [13]. Wand and Weber have extended the ontology presented by Mario Bunge [14] and developed a formal foundation called BWW model for modelling information systems. Elements in BWW model (in the text shown in italics) can be organized in the following groups (adapted from [17]):

1. *Thing* – including *Properties, Classes* and *Kinds* of *Things*. *Thing* is an elementary unit in BWW. *Things* possess *Properties*, which defines *States* of a *Thing*. *Things* can belong to *Classes* or *Kinds* depending on a number of common *Properties*. A *Thing* can act on another *Thing* if its existence affects the *History* of the other *Thing*. *Things* are coupled if one *Things* acts on another.
2. *State of Thing – Properties* of *Things* define their *States*. *State Law* restricts *Values* of *Properties* of *Things*. *Conceivable State Space* is a set of all *States* a *Thing* can assume. *Lawful State Space* defines *States* that comply with *State Law*. *Stable State* is a *State* in which a *Thing* or a *System* will remain unless forced to change by a *Thing* in the *System Environment*. *Unstable State* is a *State* that will be changed into another *State* by the *Transformations* in the *System*. *History* is the chronologically-ordered *States* of a *Thing*.
3. *Transformation* – transformation between *States of Things*. *Transformation* is a mapping from one *State* to another. *Lawful Transformation* defines which *Events* in a *Thing* are lawful.
4. *Event* – event is a change in *State* of a *Thing*. *Conceivable Event Space* is a set of all *Events* that can occur to a *Thing*. *Lawful Event Space* is a set of all *Events* that are lawful to a *Thing*. *Events* can be *Internal Events* and *External Events*. *Events* can be *Well-Defined* - an *Event* in which the subsequent *State* can be predicted - or *Poorly-Defined* – an *Event* in which the subsequent *State* cannot be predicted.
5. *System* – a set of coupled *Things*. *System Composition* are *Things* in the *System*. *System Environment* is *Things* outside the *System* interacting with the *System*. *System Structure* is a set of couplings that exists among *Things*. *Subsystem* is a *System* whose composition and structure is a subset of the composition and structure of another *System*. *System Decomposition* is a set of *Subsystems*. *Level Structure* is an alignment of the subsystems.

This paper continues the research presented in [11] and [12] where the evaluation of BPMN and ArchiMate against BWW model was presented. Majority of BPMN and ArchiMate core elements can be mapped to BWW constructs. However, it is necessary to supplement BPMN and ArchiMate modelling languages with the missing elements in order to be able to maintain a set of object states in business process models. In BPMN and ArchiMate there is no explicit representation for object's *State*, *Conceivable State Space*, *Lawful State Space*, *State Law*, *Conceivable Event Space*, *Lawful Event Space*, and *History* – the resulting BPMN and ArchiMate models may be irrelevant and modellers may need to incorporate additional modelling techniques to overcome these defects. It may be impossible to detect from BPMN and ArchiMate models which states should be expected to occur and which states can occur but are illegal (unlawful). Another important aspect is lacking of element *History* which chronologically describes state changes of business objects. This deficiency can lead to problems regarding maintaining system's log and recovery.

The authors of [5] propose a notion of "weak conformance" which checks conformance of a process model with respect to data objects. This notion can be used to tell whether in every execution of a process model each time a task needs to access a data object in a particular state, it is ensured that the data object is in the expected state or can reach the expected state and, hence, the process model can achieve its goals.

In [18] authors identify that consistency between business process models and object life cycle is required, however, their relation is not well understood. Authors clarify this relation and propose an approach to establish the required consistency by explicitly defining object states in business process models and then generating life cycles for each object type in the process. The authors of [18] indicate that object life cycle modelling is valuable at the business level. However, we propose to consider states of objects also at the application and technology levels of enterprise architecture since objects can be hidden and specified in sub-process structures at different levels of an enterprise. The authors of [19] use object life cycle as a common means for explicitly modelling allowed state transitions of an object during its existence and propose a technique for generating a compliant business process model from a set of given reference object life cycles. The notion of a "legal state" is also mentioned in [20] where authors indicate that the representation of legal states in a model of a trade procedure is essential because organizations should be able to derive their obligations, rights, and duties at each point during the execution of the trade procedure and propose to annotate the states in Petri nets.

In [1] authors investigate the use of temporal deontic assignments on activities as a means to declaratively capture the control-flow semantics that reside in business regulations and business policies. In object-oriented paradigm, state machines are extensively used for representation of states of objects [21]. In [22] the authors propose logic based formalism for describing the semantics of business contracts and the semantics of compliance checking procedures and close the gap between business processes and business contracts.

This research differs from the related work in that it uses BWW model as a missing part or a bridge to close the gap between: (1) legal states represented in policies, (2) BPMN business process models, (3) active and passive structure elements represented in ArchiMate EA models (business objects and subjects).

3 The Proposed Approach

The proposed approach requires the following prerequisites:

1. There is a policy describing legal and illegal states of business objects that an organization must be complaint with.
2. There is a BPMN business process model that needs to be monitored against the policy to indicate the gap.
3. There is an ArchiMate EA model that describes business objects and subjects (active and passive structure elements) depicted in the BPMN business process model.
4. There is an expert from the represented business domain using the approach that is familiar with BPMN, ArchiMate and BWW model (further in the text – the modeller).

The proposed approach includes the following steps (see Figure 1):

1. Structure a BWW model of a policy using a questionnaire – the input to the activity is an existing policy in a textual form. The questionnaire is presented to the modeller online in the form of questions to answer. The questionnaire is built specifically to answer the questions about the policy in the context of the BWW model to be able to construct the BWW model automatically with the values of the BWW model elements recorded against questions. The output of the activity is the constructed BWW model of the policy. The BWW model of the policy is constructed in a canonical way by means of an XML document. Below are examples of the questions from the questionnaire:
    a. How many *Things* the policy describes?
    b. What *Things* are passive elements?
    c. What *Things* are active elements?
    d. Describe *Properties* of each *Thing* (*Property* name and *Property* value).
    e. Describe *State Law* of each *Thing* (*Values* of the *Properties* that are lawful).
    f. Describe *Lawful States* based on the *State Law*.
2. Structure a BWW model from an as-is BPMN business process – the input to the activity is the as-is BPMN business process model that describes the existing business process. The purpose of the approach is to check the existing business process model against the policy to indicate the gap. This step uses the BPMN model to construct the BWW model to be able to compare it with the BWW model of the policy. This step uses the mapping of BPMN to the BWW model presented in [17] and [21] to construct the BWW model from the BPMN business process model. The output of the activity is the BWW model of the BPMN business process model.
3. Structure a BWW model of an as-is ArchiMate EA model – the input to the activity is the as-is ArchiMate EA model that describes the existing enterprise architecture that refines the existing BPMN business process model. This step uses the ArchiMate model to construct the BWW model to be able to compare it with the BWW model of the policy. This step uses the mapping of ArchiMate to the BWW model presented in [12] and [21] to construct the BWW model from the ArchiMate model. The output of the activity is the BWW model of the ArchiMate EA model.
4. Merge the BWW models constructed from the BPMN and ArchiMate models into one BWW model – the input to the activity are both BWW models constructed from the BPMN business process model and the ArchiMate EA model. The BWW models are represented as XML documents and merged into one XML document to represent one BWW model that will be compared with the BWW model of the policy.
5. Compare the BWW model of the policy against the BWW model of the existing business process models – two canonical representations of the BWW models are compared to indicate the gap between the existing business process models and the policy. The BWW models are represented as XML documents and two XML documents are compared to indicate the differences between the two. The gap represents elements that are missing in the existing business process models compared to the policy. If the gap exists, this means that the

business process models are not compliant with the policy and might contain illegal business objects states. The gap is represented as a set of differences between two XML documents.

6. Step 6 and 7 are outside of the scope of the approach, however these steps are recommended for organizations since the goal of the compliance checking is to build a to-be business process model that is compliant with the policy and describes all the necessary business objects and states represented in the policy. Step 6 is performed by the modeller to analyse the indicated gap as an initial step to construct the to-be business process model. Step 7 is creating the to-be business process model (BPMN and ArchiMate models). The to-be business process model can be monitored against the policy using the previous steps.

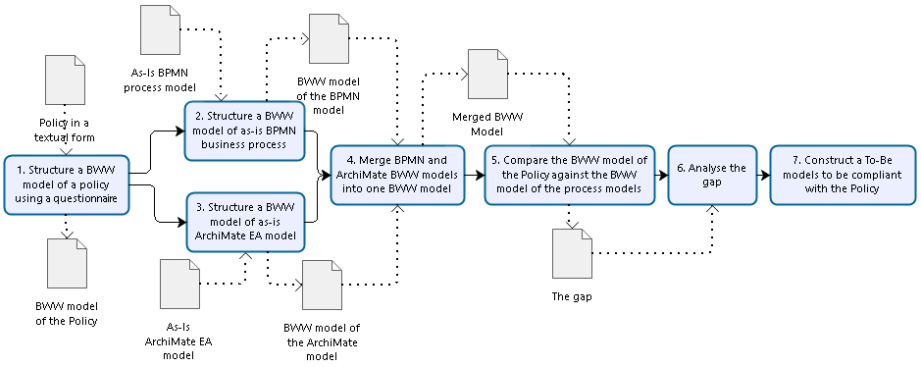

Figure 1: The steps of the proposed approach.

The construction of the BWW model from BPMN and ArchiMate models includes the following:

1. Explicitly defining *Things* from the models – both active and passive structure elements.
2. Explicitly defining *Properties* of *Things* (business objects and subjects) using formal definitions presented in [22] and indicating whether business object is an input or output parameter of an activity.
3. Explicitly defining *Conceivable State Space* based on the *Properties* of the *Things*.
4. Explicitly defining *State Law* of *Things* and *Lawful State Space* of business objects and subjects based on the *State Law*.

Compliance can be checked during or after the execution of the business process, called compliance by detection; or compliance can be checked while modelling the business process, called compliance by design [23]. The proposed approach in this paper employs the compliance by design approach. The proposed approach for monitoring compliance of business processes with policies requires a repository-based modelling tool that accommodates BPMN, ArchiMate, and BWW.

4 Example

This section describes an example to explore how the proposed approach can be applied to a scholar publisher business domain and support the publisher's needs to change its journal publishing business process to be compliant with the OA initiative. The scholar publisher presented in this section is the university press that publishes the journal of the history of medicine. Existing business process of the scholar publisher is based on a traditional printed and subscription-based publishing business model, and it is clear that the publisher does not support OA. However, a deeper analysis is needed to understand the gap between the OA policy and the existing business process models. The proposed approach in this paper can be used to indicate the gap between the OA policy and the existing publishing process.

The goal of the scholar publisher is to change its publishing business process to become more visible and discoverable online, and to improve bibliometric indicators, e.g., citations. Also the research published in the journal is publicly-funded and according to the European Commission guidelines must be OA [2].

To achieve the goal the editorial team of the scholar publisher has made a decision to launch a project for inclusion in the Directory of Open Access Journals (DOAJ) [24]. DOAJ is a community-curated list of open access journals and aims to be the starting point for all information searches for quality, peer reviewed open access materials [24]. To be included in the DOAJ any publisher must be compliant with the basic requirements for inclusion in DOAJ. These requirements are available online [25], here are some examples of the DOAJ requirements:

1. All content (full texts of journal articles) should be available for free and be Open Access without delay (i.e. no embargo period).
2. User registration is not acceptable and journals requiring users to register to read full text will not be accepted.
3. All articles must have a publication date. DOAJ encourages the use of unique article identifiers, such as the DOI.
4. DOAJ considers the application of a Creative Commons license [26], or its equivalent, as the best practice.

In the context of this paper these requirements are considered as a policy that the publisher's business processes must be compliant with. Now it is possible to proceed to the first step of the approach – to make a canonical description of this policy based on the BWW model. The constructed BWW model will be used as a framework to monitor compliance of the business process. To construct the BWW model, the formal definitions of the BWW model are used described in [22]. Below (see Table 1 and Table 2) is presented a fragment of BWW model of the DOAJ inclusion policy. Table 1 shows *Things* and all possible *Properties* of *Things* described in the DOAJ policy, and also the *Property* "Type of Thing" is added for the purpose of differentiating active and passive structure elements based on ArchiMate. A *Thing* is the elementary unit in the BWW model. *Things* possess *Properties*. A *Property* is modelled via a function that maps the *Thing* into some value. Table 2 shows *State Law* and *Lawful State Space* based on the *State Law*. A *State Law* restricts the values of the *Properties* of a *Thing* to a subset that is deemed lawful, e.g., an article cannot be an active type of thing. *Lawful State Space* is the set of *States* of a *Thing* that comply with *State Law* of the *Thing*.

According to the approach, the BWW model of the policy can be represented in a formal way, e.g., as XML document, see Code Fragment 1 of the XML code below.

Table 1: The BWW model of the DOAJ inclusion policy (1)

Thing	Properties			
	Property	Values		
Article	Type of Thing	Active	Passive	
	Full text OA?	Yes	No	
	Separate URL per article	Yes	No	
	Publication Date	Year	Date	Not available
	Review type	Not available	Peer review	Editorial
	Review date	Not available	Date	
	Copyright and licensing	Creative Commons	Other	
	Unique Identifier	DOI	Other	Not available
Full Texts	Type of Thing	Active	Passive	
	Open Access	Yes	No	
	Embargo	Yes	No	
	Price	For free	Charges apply	
	Copyright and licensing information	Embedded	Not embedded	
	Format	PDF	HTML	other
Readers	Type of Thing	Active	Passive	
	Need to register to read full texts?	Yes	No	

Table 2: The BWW model of the DOAJ inclusion policy (2)

Thing	Property	State Law	Lawful State Space
Article	Type of Thing	Passive	
	Full text OA?	Yes	Full Texts are OA
	Separate URL per article	Yes	URL per Article
	Publication Date	Year, Date	Publication year or date is available
	Review type	Peer review	Reviewed by peer review
		Editorial	Reviewed by editorial review
	Review date	Date	
	Copyright and licensing	Creative Commons	Copyright and licensing information available
	Unique Identifier	DOI	DOI unique identifier
		Other	Other unique identifier
Full Texts	Type of Thing	Passive	
	Open Access	Yes	Full texts OA
	Embargo	No	Full texts are not embargoed
	Price	For free	Full texts are free
	Copyright and licensing information	Embedded	Copyright and licensing info embedded in full text
	Format	PDF	Full texts are PDFs
		HTML	Full texts are HTML
Readers	Type of Thing	Active	
	Need to register to read full texts?	No	Not asked to register to access full texts

Code Fragment 1: The fragment of the XML code of the DOAJ policy BWW model

```
<xs:element name="Article">
        <xs:complexType>
            <xs:attribute name="Type_of_Thing" type="xs:string"/>
```

```
            <xs:attribute name="Full_text_OA" type="xs:boolean"/>
            <xs:attribute name="Separate_URL_per_article"
type="xs:boolean"/>
            <xs:attribute name="Publication_Date" type="xs:date"/>
            <xs:attribute name="Review_type" type="xs:string"/>
            <xs:attribute name="Review_date" type="xs:date"/>
            <xs:attribute name="Copyright_and_licensing"
type="xs:boolean"/>
            <xs:attribute name="Unique_Identifier" type="xs:string"/>
        </xs:complexType>
    </xs:element>
```

The next step of the approach is to construct a BWW model from the existing BPMN process model based on the BPMN-BWW mapping presented in [17] and [21]. A fragment of the existing publishing business process BPMN model is depicted in Figure 2. The existing ArchiMate EA model is presented in Figure 3. The BWW models of both models are constructed based on the previous work described in [17] and [21].

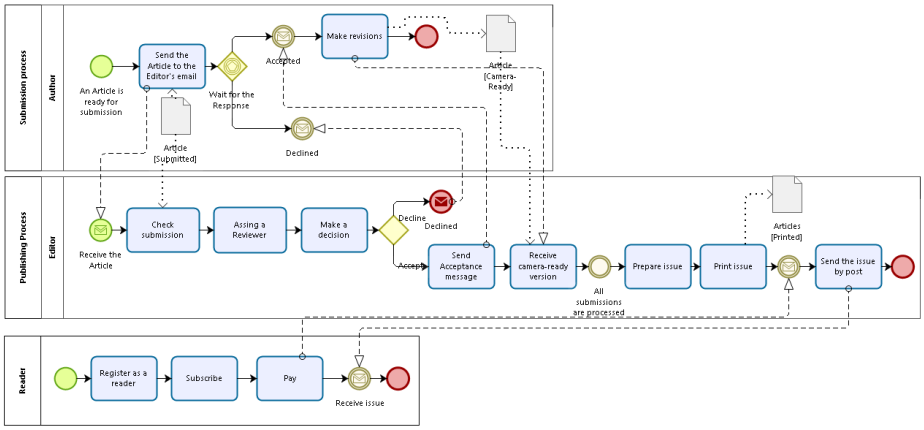

Figure 2: The fragment of the as-is BPMN business process model of the publisher.

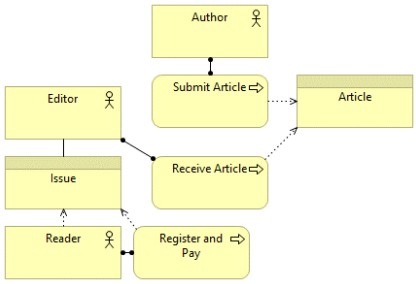

Figure 3: The fragment of the ArchiMate model of the publisher.

A fragment of the BWW model from both models are presented below (see Table 3).

Table 3: The fragment of the BWW model of the existing models.

Thing	Property	State Law	Lawful State Space
Article	Type of Thing	Passive	
	Submitted	Yes	Article submitted
	Checked by Editor	Yes	Article checked by Editor
	Reviewer assigned	Yes	Reviewer assigned
	Reviewed	Yes	Reviewed by peer review
	Review date	Date	
	Decision made	Accepted	Article accepted
		Declined	Article declined
	Printed	Yes	Article printed
	Publication date	Date	Publication date is available
Issue	Type of Thing	Passive	
	Prepared	Yes	Issue prepared
	Printed	Yes	Issue printed
	Sent by post	Yes	Issue sent
Editor	Type of Thing	Active	
Readers	Type of Thing	Active	
	Need to register to read full texts?	Yes	Reader is registered
	Need to pay to read full texts?	Yes	Reader has paid

The next step is to compare two canonical descriptions of the constructed BWW models to indicate the gap between the policy (Table 1, Table 2) and the existing business process models (Table 3). Below is presented a fragment of the comparison between lawful states of the policy and lawful states depicted in the existing models (comparison between Table 2 and Table 3 is presented, see Table 4).

Table 4: The fragment of the comparison between the BWW models.

Lawful State Space from the Policy	Corresponding Lawful State Space from the models
Full Texts are OA	No corresponding lawful state description in the existing models
URL per Article	No corresponding lawful state description in the existing models
Publication year or date is available	Publication date is available
Reviewed by peer review	Reviewed by peer review
Reviewed by editorial review	No corresponding lawful state description in the existing models
Copyright and licensing information available	No corresponding lawful state description in the existing models
DOI unique identifier	No corresponding lawful state description in the existing models
Other unique identifier	No corresponding lawful state description in the existing models
Full texts OA	No corresponding lawful state description in the existing models
Full texts are not embargoed	No corresponding lawful state description in the existing models
Full texts are free	No corresponding lawful state description in the existing models
Copyright and licensing info embedded in full text	No corresponding lawful state description in the existing models
Full texts are PDFs	No corresponding lawful state description in the existing models
Full texts are HTML	No corresponding lawful state description in the existing models
Not asked to register to access full texts	No corresponding lawful state description in the existing models

From the Table 4 it can be concluded: (1) that existing business process models are not compliant with the policy and (2) which lawful states of business objects and subjects from the policy are not represented in the existing business process models.

This gap is an input for constructing a to-be business process model that is compliant with the policy. This example does not fully represent the proposed approach, only the main idea behind the approach is illustrated. The presented work is a research in progress.

5 Conclusions

This paper presents an ongoing research towards supporting organization in monitoring compliance of business processes with policies. The BWW model is used as the foundation, since it allows straightforwardly addressing the lawful and conceivable state spaces of business objects. The previous research has shown that BPMN and ArchiMate lack in ability to describe flow of business objects in business process models and explicitly declare states of business objects imposed by regulations (see [10], [11] and [12]). This gap hinders compliance of business process models with different policies. There are 6 BWW model elements that are not supported by these modelling languages, namely, *State Law*, *Conceivable State Space*, *Lawful State Space*, *History*, *Conceivable Event Space*, and *Lawful Event Space*.

This research differs from the related work in that it uses the BWW model as a missing part or a bridge to close the gap between: (1) legal states represented in policies, (2) BPMN business process models, and (3) active and passive structure elements represented in ArchiMate EA models (business objects and subjects). The proposed approach supports organization in defining a canonical representation of policies using the questionnaire that is based on the BWW model. Based on the questionnaire answers the BWW model of policy is constructed. The proposed approach includes construction of the BWW model for existing BPMN and ArchiMate models to compare it with the BWW model of the policy to indicate the gap between existing business processes and policies. Comparison between the structured representations of (1) the policy, and (2) the business process models provides organization an explicit method to see what states are missing and with what elements the existing business process must be refined in order to be compliant with the new policy. The paper describes how the proposed approach can support scholar publishers in achieving compliance with the OA policies. However, the proposed approach is developed to be universal and can be used in other business domains.

Definition of object states in business process models are especially required in data-driven processes – in any process model that is based on data and manipulates with business objects. The main contribution of the research will be a formalized solution prototype that will support organizations in facilitating monitoring of the compliance of business processes with policies.

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