View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by AIS Electronic Library (AISeL)

Association for Information Systems
AIS Electronic Library (AISeL)

Wirtschaftsinformatik Proceedings 2015 Wirtschaftsinformatik

3-24-2015

Workaround Aware Business Process Modeling

Nina Röder

Manuel Wiesche

Michael Schermann
Santa Clara University

Helmut Krcmar

Follow this and additional works at: http://aisel.aisnet.org/wi2015

Recommended Citation
Röder, Nina; Wiesche, Manuel; Schermann, Michael; and Krcmar, Helmut, "Workaround Aware Business Process Modeling" (2015). *Wirtschaftsinformatik Proceedings 2015*. 33.
http://aisel.aisnet.org/wi2015/33

This material is brought to you by the Wirtschaftsinformatik at AIS Electronic Library (AISeL). It has been accepted for inclusion in Wirtschaftsinformatik Proceedings 2015 by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Workaround Aware Business Process Modeling

Nina Röder, Manuel Wiesche, Michael Schermann, and Helmut Krcmar

Technische Universität München, Garching bei München, Germany
{nina.roeder,wiesche,michael.schermann,krcmar}@in.tum.de

Abstract. Workarounds are an omnipresent part of organizational settings where formal rules and regulations describe standardized processes. Still, only few studies have focused on incorporating workarounds in designing information systems (IS) or as a part of management decisions. Therefore, this study provides an extension to the Business Process Modeling Notation (BPMN) by conducting a metamodel transformation, which includes workarounds. As a result, the *Workaround Process Modeling Notation* (WPMN) (1) leads organizations in designing workaround aware systems, (2) supports managers in deciding how to deal with workarounds, and (3) provides auditors with visualizations of non-compliance. We exemplify how this technique can be used to model a workaround in the process of accessing patient-identifying data in a hospital. We evaluated the model and find it particular suitable as an empirically grounded BPMN extension.

Keywords: Business Process Modeling, Workarounds, Process Deviation

1 Introduction

An extensive body of research provides advances in understanding workarounds as part of business processes [1-3]. Workarounds are described as alternative work processes and are seen frequently as a mismatch between the expectations of technology and actual working practices [2]. They can occur when users bypass a process, practice obstacle or requirement [4], respond to a mishap [5], or pretend to comply [6]. Several examples in literature express the prevailing impulse of users to overcome inadequate IT functionality [7]. Therefore, theoretical models that summarize different effects and consequences of workarounds are wide-spread throughout research [1, 8]. Overall, workarounds are the result of a consideration of risks and benefits associated with the input and outcome [7]. As the benefit and risks or costs of workarounds are hard to measure [9], it is essential to push research towards understanding their effect on business processes [2].

In general, business process management (BPM) has received widespread attention by organizations offering them a means of optimizing their processes in a manner that aligns with their business objectives [10]. Literature agrees when discussing the necessity of a comprehensive understanding of business processes and its positive impact on an effective and efficient BPM [10]. Using a holistic approach to analyze and design business processes in a structured, coherent and consistent way is crucial for

12th International Conference on Wirtschaftsinformatik,
March 4-6 2015, Osnabrück, Germany

Röder, N.; Wiesche, M.; Schermann, M.; Krcmar, H. (2015): Workaround Aware Business Process Modeling, in: Thomas. O.; Teuteberg, F. (Hrsg.): Proceedings der 12. Internationalen Tagung Wirtschaftsinformatik (WI 2015), Osnabrück, S. 482-496

organizations [11]. In this way, BPM helps in understanding, documenting, modeling, analyzing, simulating, executing and continuously changing end-to-end business processes in light of their contribution to business performance [12]. One of the most common process modeling languages is Business Process Modeling Notation (BPMN). Organizations using BPMN seek to analyze, predict and improve their business processes in order to gain a competitive advantage [11]. Recently, attention has been paid to design process modeling grammars that provide a means for handling the process complexity and flexibility of work systems [10, 13-15]. The field of research regarding modeling of workaround behavior within business process is still scarcely explored [16].

Thus, in this paper we broaden the understanding of workaround aware business process modeling. We ask the research question: *How can workarounds be modeled in order to learn from process deviations?* We do this to understand workarounds as an omnipresent part of business processes, regardless of whether they have a positive or negative influence. Organizations that are able to model workarounds can use this approach to understand, improve, adapt and redesign their business processes to benefit from living processes gained from practice. Hence, with this study: (1) We support system designers with information regarding potential workarounds that can occur in their business processes, resulting in workaround aware system design. (2) We provide managers with a more informed understanding of workarounds to help them decide whether to tolerate, hinder or embrace them. (3) We visualize non-compliance to improve the support of business process auditors.

We structure the remainder of this paper as follows. First, we introduce workarounds and related work to describe the theoretical foundation for studying our research question. We then introduce workarounds in process modeling using a theoretical construct and a metamodel. To exemplify the notion of workaround aware business process modeling, we use data from a case study conducted in the health care domain. We conclude the paper by highlighting the key results and present worthwhile avenues for future research.

2 Theoretical Foundation

2.1 Workarounds

In research, workarounds are frequently seen as first-order solutions to problems [17] and informal practice for handling exceptions to normal work flow [18]. The misfit between enactments of power that confront organizational members in their daily work can result in acts of deviance [19]. In this research we extend this view and see workarounds as process deviations that are ambivalent and related to information systems (IS) [20]. The ambivalent character understands workarounds as both inventive solutions and challenging alternatives within a work system [9]. As actors may often work to achieve multiple and sometimes conflicting goals [2], the workaround can be best understood as the outcome of a situational risk-benefit analysis [21]. From an employee perspective, they are executed when the deviation results in an increase in the outcome and a decrease in the input [7]. This is the fact when, for

example, the time to execute a certain process can be reduced while the result can actually be improved. Besides, much more often workarounds are triggered by IS as a part of a broader work system. In this work system, "human participants and/or machines perform work using information, technology, and other resources to produce specific products/services for specific internal and/or external customers" [22]. Reducing process variability and thus workarounds, IS further aim to prevent potential losses for gains in efficiency [23]. Several researchers have studied the phenomena of workarounds throughout various organizational settings with different outcomes [1, 24, 25]. Still, it is the core issue about improving and hindering perceptions of workaround behavior which keeps theorist and practitioners busy. Overall, literature distinguishes different types of workarounds. Table 1 provides an overview of examples of existing workaround types [1].

Table 1. Examples of Workaround Types (based on [1])

Type	*Source*	*Description of Business Process*	*Summary of Workaround*
Overcome inadequate IT functionality	Print Industry [26]	Track full process with IS by respective worker	Operators record the progress of their work on paper tickets instead of system as it is conflicting with the activities involved
Bypass an obstacle built into processes or practices	Health Care [23]	Medication dispense needs to await formal approval order and needs to follow concrete process steps	Nurses disconnect orders from awaiting approval and dispense restricted medication immediately when needed
Respond to a mishap or anomaly with a quick fix	Health Care [27]	Complete care plan by 3 hours after physical admission	Care plans are not completed in specified time frame as nurses perceive system useless as long as patients are happy
Design and implement new resources	IT environment [28]	Using IT to exploit user-driven innovation and identify potential improvements	Employees use private mobile devices as shadow IT

Avoiding IS and using paper forms instead, Button [26] investigates the print industry and how lacking system flexibility and deficiencies leads to workarounds which continue leading to other workarounds. He proposes that employees may resist but at the same time conform, to management control. The employees did not circumvent control by not using the IS, instead they report on paper and add notes about system failures. Azad and King [23] found that formal prior-approval procedures are not followed in hospital processes. Within health care, patients' well-being stands above all bureaucratic procedures. Instead of awaiting the approval, nurses dispense medication immediately. Timmons [27] provides nurses' perception of reporting systems in hospitals. In his research he shows that miscommunicated reasons for the purpose of a reporting system result in resistance. Physicians do not execute their audits frequently and are demotivated since nobody else reports. "They were not able to resist the im-

plementation, but were able to resist the surveillance" [27]. György et al. [28] study the inability of IT departments to fulfil business needs and focus on user-driven fulfilment of requirements, which they call Shadow IT.

2.2 Business Process Modeling

In this research we understand business processes as "the combination of a set of activities within an organization with a structure describing their logical order and dependence whose objective is to produce a desired result" [29]. Any process is governed by a series of rules that define what to do and when [16]. With modeling techniques those business processes are an attempt to be visualized for creating effective and efficient use of organizational resources. In today's dynamic and competitive business environment, process models are subject to frequent and unavoidable change [30]. They are used to increase awareness and knowledge of business processes, and to deconstruct organizational complexity [31]. The graphical articulation of activities, events or states, and control flow logic as part of process modeling is used to discover existing processes, and document them in a way that helps managers in making improvement or change decisions. Limitation of process models is most frequently felt in their inability to cater to unanticipated cases [14]. Especially when adapting manifestations and consequences that arise in practice, real-world challenges are difficult to model for organizational documentation and process improvement [32]. In the BPM context, the Business Process Modeling Notation (BPMN) is a standard for the representation of business processes [33] and will be subject of this research. Prior work has already focused on several aspects from dynamic process interpretations to flexible system design in practice (Table 2).

In their research Becker et al. [10] focus on process modeling in creative domains and introduce a conceptual process modeling grammar for processes in creative environments. Using pockets of flexibility as a basic construct, they build on the concept derived from Sadiq et al. [34]. This construct focuses on flexibility as an ad hoc workflow presentation, where dynamic, adaptive and flexible workflows prevail. Thus, both papers [10, 34] focus explicitly on processes in which creativity and flexibility is perceived as improving. Other than this, our goal is to describe deviations in processes where it is not clear if the workaround is either improving or hindering the business process. Nadrah and Michell [16] provide a normative method to analyze workarounds in a healthcare environment. By doing so, they offer guidelines to organizations on how to deal with workarounds. Nevertheless, their process illustration neglects the distinction between formal process standards and the workaround execution. Instead, they provide two separate models to explain the deviations from the process. In their research van der Aalst et al. [35] describe case handling as a paradigm for supporting flexible and knowledge intensive business processes. The use of case handling refers to situational decisions in which authorized employees have to consider corresponding workflow process definitions. Thus, deviations of unexpected behavior are not part of their research. Furthermore, Koehler [15] provides a methodology for modeling dynamic BPM solutions. It includes business rules, actors, and life cycles in a loosely coupled system, interacting through message exchanges. Bocci-

arelli et al. [11] focus on the extension of BPMN and provide an approach to integrate non-functional properties, e.g., performance and reliability, in their construct. They study the effect that those adaptions have on the overall performance prediction at design time. Still, all mentioned attempts to integrate process variability miss the comprehension of the risk-benefit analysis as a part of the workaround execution

Table 2. Related Work for Modeling Deviations

Source	*Context and Focus*	*Identified Problem*	*Proposed Solution*
Becker et al. [10]	Process modeling lacks approaches for highly creative environments with high levels of flexibility	Existing modeling approaches are restricted to processes that are well-structured and predictable	Approach to process analysis that aims at the identification and specification of creativity in business processes
Nadrah and Michell [16]	Understand healthcare information systems as they cause rather than cure problems	Capture social aspects of behavior/motivation and the means to measure the effort and benefit of workarounds	Normative approach for modeling workarounds with their motivation, constraints, and consequences
van der Aalst et al. [35]	Case handling in business process support requires decisions by knowledgeable worker	Case handling as a new paradigm for supporting knowledge-intensive business processes	Main entities of case handling systems are identified and classified in a meta model
Koehler [15]	Modeling methodology for dynamic process solutions	Need to shift from an explicit modeling of predefined end-to-end processes to an agile design approach	Introduce modeling elements of business object life cycles, business rules, and business activities
Bocciarelli et al. [11]	Extending BPMN with non-functional properties of business processes	Non-functional properties are not included in BPMN	Lightweight BPMN extension for the specification of properties that address performance and reliability

3 Introducing Workarounds in Business Process Modeling

3.1 Business Process Modeling Notation (BPMN)

We choose BPMN as being one of the fastest spreading business process languages [31] with a design that is understandable for both business professionals and IT-specialists [36]. Figure 1 describes the graphical modeling elements that BPMN uses to represent business processes.

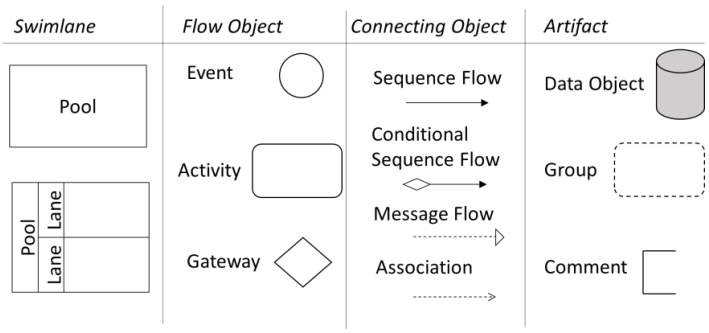


Fig. 1. Relevant Constructs of BPMN 2.0 Modeling Elements [33]

Pools and lanes are used to structure different organizational units (pools) and roles or functions within those units (lanes). Three connecting objects set three categories of flow objects (events, activities, and gateways) in relation to each other. Within the same pool, sequence flow is used to indicate the order in which the activities are performed - including sequence flows that have to fulfill a condition before traversing (part of BPMN 2.0). Message flows are used between pools to model communication with other organizations. Associations relate artifacts (data objects, groups or comments) to other modeling elements [36]. With BPMN 2.0 this basic model has been refined and enhanced to strive for a new level of integrating business-user-friendly modeling [33]. Still, the proposed elements do not cover the possibility to integrate the risk-benefit analysis as part of workaround behavior.

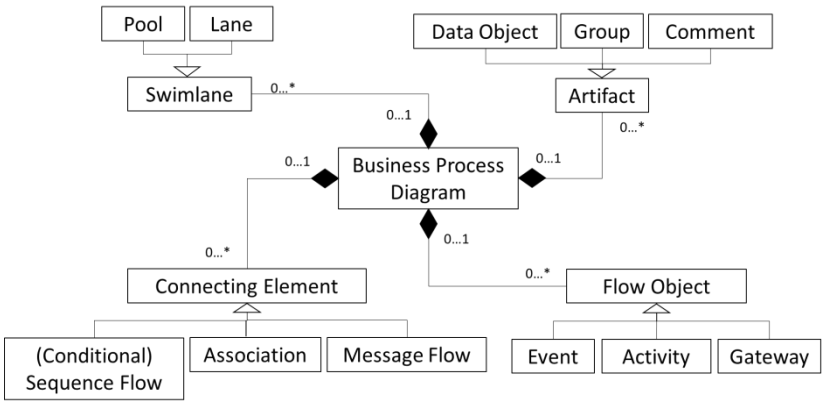


Fig. 2. BPMN Modeling Elements [33]

As a BPMN process is graphically represented by use of BPD, we rely on the conceptual model to introduce workaround aware business process modeling [11]. Graphs are used for execution semantics, nodes are flow and arcs are connecting objects [11]. The core elements of BPD and their relationship are illustrated in Figure 2. The main class BusinessProcessDiagram relates all other elements and is used to represent a specific business process [37]. Each of the modeling elements is related to the main class.

3.2 BPMN Extension

The two research streams of workarounds and process modeling have been viewed largely independent of each other. Therefore we provide progress towards an integrated workaround aware business process modeling. After introducing the main elements and the BPD metamodel we follow the metamodel extension [11] (Figure 3).

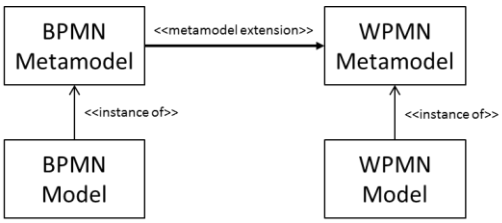
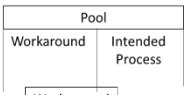
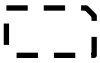


Fig. 3. Metamodel Extension Process (adapted from [11])

Extending the BPMN metamodel means adding new metaclasses and meta-associations to it. We follow the guidelines of the OMG Meta Object Facility (MOF), which is an object-oriented framework for describing meta-objects [38]. As the metamodel itself is a valid instance of the MOF metametamodel, extending the BPMN metamodel means defining a new modeling language by instantiating a new MOF model. We name the new model Workaround Process Model and Notation (WPMN).

Table 3. Constructs of Workarounds

Construct	*Description*	*Example*	*Representation*
Workaround	Process steps that are related to the workaround	Circumvent monitoring [2]	
Type	Differentiation of workaround types	Overcome inadequate IT functionality [7]	
Risk-Benefit Analysis	Situational factors influence risk-benefit decision	Necessary activity in everyday life [9]	
Situational Factors	Attributes that influence the risk-benefit analysis	Knowledge about easier way [2]	
Workaround Activity	Activities which guide the workaround process	Enactment of interpretive flexibility [39]	
Business Rules	Rules or policies that determine the standard process	Compliance or non-compliance with management intentions [14]	
Consequence	Local and broader consequences	Impacts on subsequent activities [40]	

We use the process theory of workarounds [1] in order to extend the metamodel, which helps us to understand in which context a workaround is executed and how it

has to be integrated in a modeling technique. Table 3 provides an overview of the factors that need to be considered when analyzing workaround behavior. This includes the *workaround*, which consists of all the process steps that are related to the deviation, as circumventing monitoring [2]. We refer to the *type* with regard to the differentiation of Alter [1] which includes (1) overcome inadequate IT functionality, (2) bypass an obstacle built into processes or practices, (3) respond to a mishap or anomaly with a quick fix (4) substitute for unavailable resources (5) design and implement new resources, (6) prevent future mishaps, (7) pretend to comply (8) lie, cheat, steal for personal benefit and (9) collude for mutual benefit. The *risk-benefit analysis* to work around a process is influenced by several factors that in sum lead to the execution. If the benefit overweighs the risks, then a workaround seems to be appropriate in this certain situation [9]. *Situational factors* determine risks and benefits of a workaround, e.g., knowing an easier way to do the work [2]. Hence, *workaround activities* are enacted when e.g., interpretative flexibility prevails [39]. In this context, *business rules* represent formal guidelines, which are worked around. As a result employees may stick to compliance or be non-compliant [14] depending on their workaround behavior. The *consequences* that appear can have impacts on subsequent activities [40] or even cause other workarounds to achieve a certain goal.

The core characteristics of the process environment have been identified after analyzing the existing workaround with the theoretical construct. We build on this process preparation to be able to integrate workarounds in formal business process representation. The BPD metamodel is extended by adding the required metaclasses (Figure 4).

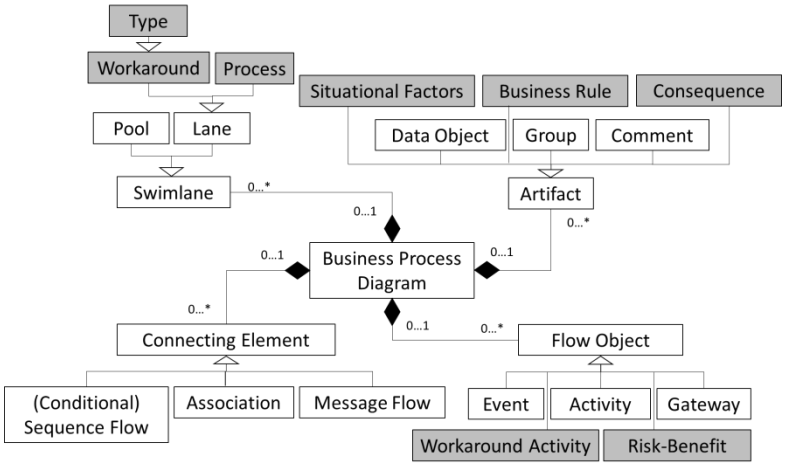


Fig. 4. Business Process Diagram (BPD) Metamodel Extension

As we focus on processes in which workarounds are executed, the greyed-out constructs have been added to the metamodel. We see the type of workaround as a lane construct existing together with a predefined process. Cause and decision are connected to flow objects, whereas motivation, business rules and consequences are generalizations of artifacts.

4 Application example

In this section we introduce an example from practice in order to test our proposed metamodel extension. With respect to the metamodel transformation method we will introduce an instance of the derived BPD metamodel extension, which we call Workaround Process Modeling Notation (WPMN).

4.1 Case description

The example is based on a case study in the health care sector where common security issues are privacy breaches, especially within information systems. As subject we studied the work system of administering patient data in the patient care information system (PCIS). Our sample included ten semi-structured interviews: five junior and three senior physicians, one security officer and one IT director. Members of the research group conducted the interviews with respect to health care processes in practice. The average interview time was about 55 minutes. We found that physicians balance the potential consequences resulting from a privacy breach and the improvements in effective patient care. They fear that compliance may hinder lifesaving and therefore often ignore privacy guidelines. We identified several workarounds that are executed within the health care domain, but will focus on one example to illustrate our proposed BPMN extension. The workaround - *drag data* - involves physicians who copy patient records from the secure information system onto private storage systems. The hospital implemented PCIS in order to store and process all patient records. Physicians must not download any confidential information from the system as it is prohibited by the data privacy law. Furthermore, medical confidentiality can no longer be guaranteed when data is downloaded from the secure system onto external storage. However, physicians copy patient records onto USB sticks or send them via e-mail to other physicians or to their private accounts. They do this in order to ask colleagues for their opinion or in order to work from home.

4.2 WPMN Example

We introduced WPMN as a first approach to integrate workarounds in business process modeling. With the metaclasses derived earlier, we seek to model the ‘drag data’ workaround (Figure 5). This example can be categorized into the type ‘bypass an obstacle built into processes or practices’ (highlighted in green). Physicians perceive the process a hindrance, because they are not allowed to download patient data from the secure system. As basic lane and pool construct we differentiated between the physicians and the IT department, which in turn is responsible for the authorization and patient record system. After logging into the PCIS, physicians are able to access patient records that are stored in the system. As a precondition they need to have access authorization to the system and to the patient data. After the system indicates the needed data, physicians are, for example, able to edit the data. In some situations the physicians download the secure data in order to share it with other physicians or to get more work done when taking the data home. This process is part of our workaround

construct visualized as a lane. They break the data privacy law and can no longer guarantee medical confidentiality. To indicate high privacy concerns with a certain patient, hospitals implemented 'VIP flags'. This flag serves as an indicator to determine whether the workaround can be tolerated. As long as the flag is not activated and the patient is an average person, data security and medical confidentiality is not considered important among physicians. As soon as the 'VIP flag' is activated, the risks that come along with the workaround outplay the potential benefits. After evaluating whether to execute the workaround or not, the deviating process is integrated back into the standard process.

4.3 Evaluation

When we applied WPMN to a first use case in health care we found that the modeling of workarounds helps in understanding the overall business process. We evaluated the model and found it particular suitable for our example. Thus, we are able to support managers to come to a better informed decision on whether to tolerate, hinder or embrace workarounds. As we build our model on extensions of the standard BPMN elements, deviations can be modeled as a part of a process using the lane construct. WPMN implies a high emphasis on these workaround parts as they can be understood as a source of improvement or foundation for implementing indicators like the 'VIP flag'. The comment artifact concerning motivation, business rules and constraints provide additional transparency throughout the process. Prior research has identified shortcomings in supporting the articulation of business rules in BPMN [31], but has already been addressed by several approaches [15]. We extend this finding by addressing the need to understand a process as not only focusing on what has to be done (rule), but actually what really is done (practice). We face challenges when including different perspectives on workarounds and how risks and benefits are balanced as an individual perception guides this analysis.

Hence, in the context of workarounds, formal structures that cope with process specifications are important to understand as well as the effect and consequence of non-compliant behavior [14]. Especially to illustrate parts of the process that are connected to workaround behavior, additional concepts had to be introduced. The ambiguous character of workarounds can be addressed by using context information which enhances the relevance of labeling [41] and addresses the risk-benefit consideration [20]. Furthermore, we confirm prior literature that assumes that costs and benefits determine to whether a workaround is executed [9]. Before employees actually execute a workaround they evaluate whether the risks or benefits prevail [20]. Thus, in each situation the workaround is observed depending on different factors that influence the decision. As an example situations where the workaround decreases the input an employee has to bring and increases the outcome, the probability is high that it will be executed [7]. If IS are implemented in a way such that they serve as gatekeeper to tolerate the workarounds that improve business processes and prohibit the ones who hinder them, their role within the business process can be interpreted from a new perspective [20]. Introducing indicators to emphasize higher risk associated with the workaround, employees can rely on practical processes that are tolerated by organiza-

tions. In certain cases when a workaround is harmful, the risks outweigh the benefits and the standard process needs to be followed.

5 Discussion and Conclusion

Workarounds comprise information gaps or inadequate system functionalities that need to be resolved when considering improvements in business processes [9]. Literature proposes that workarounds encode rich knowledge about the needs of the users and the required customizations of the IS [43]. With our research we provide a first approach to gather this information and model process deviations in BPMN. The evaluation of the 'drag data' example shows how the WPMN as an extension of the BPMN can be used to understand and analyze workaround behavior within a certain business process. Organizations are able to use workarounds as a foundation for implementing indicators to tolerate those for improving and to prohibit those that hinder.

We identified requirements to understand and represent workarounds graphically and tested our proposed modeling technique with an example from health care. This improves the support of process evaluation, as the graphical representation provides a comprehensive description of workarounds. Still, the proposed modeling approach is not able to include different perspectives on workarounds as the perception relies heavily on personal factors and may include several organizational members [19]. Nevertheless, we believe that organizations that use WPMN are able to obtain a good understanding of completely new ways of conducting their business processes and that the design allows exploratory control [42]. Hence, with this study (1) we support system designers with information regarding potential workarounds that can occur in their business processes, resulting in workaround aware system design. (2) We provide managers with a more informed understanding of workarounds to decide whether to tolerate, hinder or embrace them. (3) We visualize non-compliance to improve the support of business process auditors. Overall, it is important to note that the possibility to model workarounds relies on the willingness of organizational members to talk about their behavior and is thus dependent on credible sources of information [43].

However, this study has some limitations. Most notably, the proposed approach has been applied to only one process from health care. In health care, business processes have a high rate of uncertainty and are challenged with emergency situations which vote bureaucratic regulations down [5]. In our future research we will concentrate on industries where low uncertainty and high standardization prevail. It is planned to collect examples for each type of workaround across different industries. Further, we plan to use existing approaches, for example, method engineering, for modeling situational methods and tools [44] to deepen the understanding of workarounds in business processes. Furthermore, we plan to extend the construct of types of workarounds to provide recommendations on how to model each one in particular.

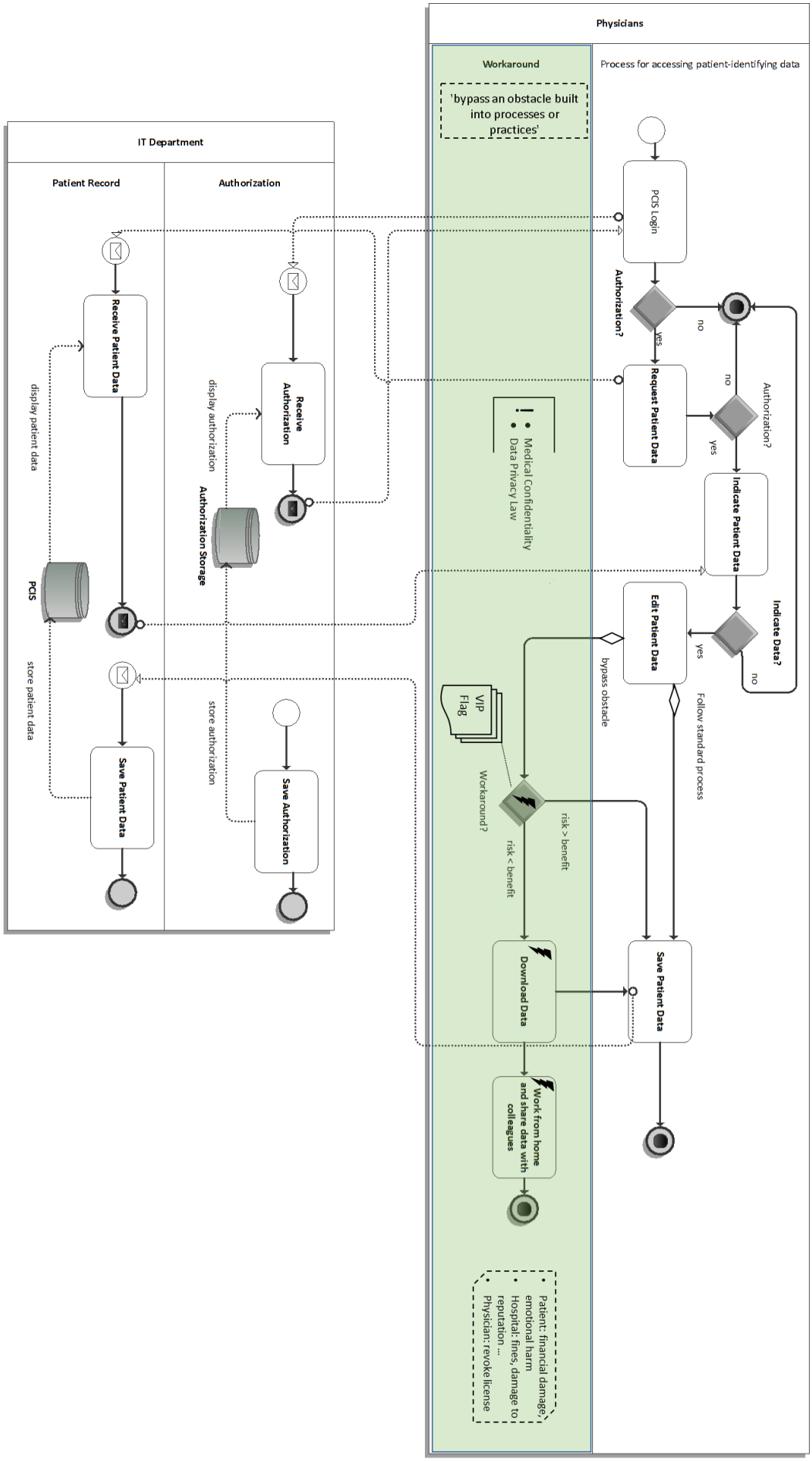


Fig. 5. Workaround ‘Drag Data’ in WPMN

References

1. Alter, S.: Theory of Workarounds. Communications of the Association for Information Systems 34, (2014)
2. Ferneley, E.H., Sobreperez, P.: Resist, Comply or Workaround? An Examination of Different Facets of User Engagement with Information Systems. In: Proceedings of the 14th European Journal of Information Systems, pp. 345-356. (2006)
3. Azad, B., King, N.: Institutionalized Computer Workaround Practices in a Mediterranean Country: An Examination of two Organizations. European Journal of Information Systems 21, 358-372 (2012)
4. Campbell, D.: Public Managers in Integrated Services Collaboratives: What works is Workarounds. Public Administration Review 72, 721-730 (2012)
5. Koppel, R., Wetterneck, T., Telles, J.L., Karsh, B.-T.: Workarounds to Barcode Medication Administration Systems: Their Occurrences, Causes, and Threats to Patient Safety. Journal of the American Medical Informatics Association 15, 408-423 (2008)
6. Boss, S.R., Kirsch, L.J., Angermeier, I., Shingler, R.A., Boss, R.W.: If Someone is Watching, I'll do What I'm asked: Mandatoriness, Control, and Information Security. European Journal of Information Systems 18, 151-164 (2009)
7. Kim, H.-W., Kankanhalli, A.: Investigating User Resistance to Information Systems Implementation: A Status Quo Bias Perspective. MIS Quarterly 33, 9 (2009)
8. Ansari, S.M., Fiss, P.C., Zajac, E.J.: Made to Fit: How Practices Vary as they Diffuse. Academy of Management Review 35, 67-92 (2010)
9. Petrides, L.A., McClelland, S.I., Nodine, T.R.: Costs and Benefits of the Workaround: Inventive Solution or Costly Alternative. International Journal of Educational Management 18, 100-108 (2004)
10. Becker, J., Karow, M., Mueller-Wienbergen, F., Seidel, S.: Toward Process Modeling in Creative Domains. Proceedings of the 15th Americas Conference on Information Systems, San Francisco, California (2009)
11. Bocciarelli, P., D'Ambrogio, A.: A BPMN Extension for Modeling non functional Properties of Business Processes. Proceedings of the 2011 Symposium on Theory of Modeling & Simulation, pp. 160-168. Society for Computer Simulation International (2011)
12. Recker, J., Indulska, M., Green, P.: How Good is BPMN Really? Insights from Theory and Practice. In: Proceedings of the 14th European Conference on Information Systems. (2006)
13. Rosemann, M.: Potential Pitfalls of Process Modeling: Part A. Business Process Management Journal 12, 249-254 (2006)
14. Sadiq, S., Governatori, G., Namiri, K.: Modeling Control Objectives for Business Process Compliance. In: Alonso, G., Dadam, P., Rosemann, M. (eds.) Business Process Management, pp. 149-164. Springer-Verlag, Berlin, Heidelberg (2007)
15. Koehler, J.: The Role of BPMN in a Modeling Methodology for Dynamic Process Solutions. In: Mendling, J., Weidlich, M., Weske, M. (eds.) Business Process Modeling Notation, pp. 46-62. Springer-Verlag, Berlin Heidelberg (2011)
16. Nadhrah, N., Michell, V.: A Normative Method to Analyse Workarounds in a Healthcare Environment: Motivations, Consequences, and Constraints. Proceedings of the 14th International Conference on Informatics and Semiotics in Organisation, pp. 195-205, Stockholm, Sweden (2013)
17. Tucker, A.L., Edmondson, A.C.: Why Hospitals Don't Learn from Failures: Organizational and Psychological Dynamics that Inhibit System Change. California Management Review 45, 55-72 (2003)

18. Kobayashi, M., Fussell, S.R., Xiao, Y., Seagull, F.J.: Work Coordination, Workflow, and Workarounds in a Medical Context. In: Conference on Human Factors in Computing Systems, pp. 1561-1564. (2005)
19. Lawrence, T.B., Robinson, S.L.: Ain't Misbehavin: Workplace Deviance as Organizational Resistance. Journal of Management 33, 378-394 (2007)
20. Röder, N., Wiesche, M., Schermann, M., Krcmar, H.: Why Managers Tolerate Workarounds – The Role of Information Systems. Proceedings of the 20th Americas Conference on Information System, Savannah, USA (2014)
21. Röder, N., Wiesche, M., Schermann, M.: A Situational Perspective on Workarounds in IT-Enabled Business Processes: A Multiple Case Study. Proceedings of the 22nd European Conference on Information Systems, Tel Aviv, Israel (2014)
22. Alter, S.: Work System Theory: Overview of Core Concepts, Extensions, and Challenges for the Future. Journal of the Association for Information Systems 14, 72-121 (2013)
23. Azad, B., King, N.: Enacting Computer Workaround Practices within a Medication Dispensing System. European Journal of Information Systems 17, 264-278 (2008)
24. Koopman, P., Hoffman, R.R.: Work-Arounds, Make-Work, and Kludges. Intelligent Systems, IEEE 18, 70-75 (2003)
25. Sobreperez, P., Ferneley, E., Wilson, F.A.: Tricks or Trompe L'Oeil?: An Eexamination Workplace Resistance in an Information rich Managerial Environment. In: Proceedings of the 13th European Conference on Information Systems. (2005)
26. Button, G., Mason, D., Sharrock, W.: Disempowerment and Resistance in the Print Industry? Reactions to Surveillance–Capable Technology. New Technology, Work and Employment 18, 50-61 (2003)
27. Timmons, S.: A Failed Panopticon: Surveillance of Nursing Practice via New Technology. New Technology, Work and Employment 18, 143-153 (2003)
28. Györy, A., Cleven, A., Uebernickel, F., Brenner, W.: Exploring the Shadows: IT Governance Approaches to User-Driven Innovation. In: Proceedings of the 20th European Conference on Information Systems, pp. 222. (2012)
29. Aguilar-Saven, R.S.: Business Process Modelling: Review and Framework. International Journal of Production Economics 90, 129-149 (2004)
30. Davenport, T.H.: Process Innovation: Reengineering Work through Information Technology. Harvard Business Press, Boston (1993)
31. Recker, J.: Opportunities and Constraints: The Current Struggle with BPMN. Business Process Management Journal 16, 181-201 (2010)
32. Indulska, M., Recker, J., Rosemann, M., Green, P.: Business Process Modeling: Current Issues and Future Challenges. Advanced Information Systems Engineering, pp. 501-514, Amsterdam, The Netherlands (2009)
33. OMG: Business Process Model Notation (BPMN). Version 2.0. http://www.omg.org/spec/BPMN/2.0/Beta2/PDF (2011)
34. Sadiq, S., Sadiq, W., Orlowska, M.: Pockets of flexibility in workflow specification. Conceptual Modeling—ER 2001, pp. 513-526. Springer (2001)
35. Van der Aalst, W.M., Weske, M., Grünbauer, D.: Case Handling: A New Paradigm for Business Process Support. Data & Knowledge Engineering 53, 129-162 (2005)
36. Müller, R., Rogge-Solti, A.: BPMN for Healthcare Processes. In: Proceedings of the 3rd Central-European Workshop on Services and their Composition, pp. 65-72. (2011)
37. Rodríguez, A., Fernández-Medina, E., Piattini, M.: A BPMN Extension for the Modeling of Security Requirements in Business Processes. IEICE Transactions on Information and Systems 90, 745-752 (2007)
38. OMG: Meta Object Facility (MOF) Core. Version 2.4.2. http://www.omg.org/spec/ (2014)

39. Ignatiadis, I., Nandhakumar, J.: The Effect of ERP System Workarounds on Organizational Control. Scandinavian Journal of Information Systems 21, (2009)
40. Boudreau, M.-C., Robey, D.: Enacting Integrated Information Technology: A Human Agency Perspective. Organization Science 16, 3-18 (2005)
41. Mendling, J., Reijers, H.A., Recker, J.: Activity labeling in process modeling: Empirical insights and recommendations. Information Systems 35, 467-482 (2010)
42. Schermann, M., Wiesche, M., Krcmar, H.: The Role of Information Systems in Supporting Exploitative and Exploratory Management Control Activities. Journal of Management Accounting Research 24, 31-59 (2012)
43. Wiesche, M., Schermann, M., Krcmar, H.: When IT Risk Management Produces More Harm than Good: The Phenomenon of 'Mock Bureaucracy'. Proceedings of the 46th Hawaii International Conference on System Sciences, Maui, Hawaii (2013)
44. Brinkkemper, S.: Method Engineering: Engineering of Information Systems Development Methods and Tools. Information and Software Technology 38, 275-280 (1996)