Context-Aware Business Process Management

Method Assessment and Selection

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Appendix (available online via http://link.springer.com)

Appendix 1 – Literature review

We conducted a structured literature review to identify existing BPM methods (vom Brocke et al. 2009; Webster and Watson 2002). The review serves as foundation for the evaluation of the Assessment and the Selection Process as well as provides high-level insights into the applicability of existing BPM methods to specific contexts. Details, including all design decisions regarding suitable publications, search strings, the chosen timeframe, and the selection of relevant articles, are presented in the following.

We identified 102 BPM methods published in renowned journals and conferences related to the BPM discipline: *Business & Information Systems Engineering* (*BISE*), *Information Systems* (*IS*), *Business Process Management Journal* (*BPMJ*), all journals from the *AIS Senior Scholars' Basket of Journals*; International Conference on Business Process Management (BPM), European Conference on Information Systems (ECIS), and International Conference on Information Systems (ICIS). While *BPMJ* and the BPM Conference are the prime outlets of the BPM community, *BISE*, *IS*, and ECIS are highly ranked IS journals and conferences with a BPM department or track. The journals of the *AIS Senior Scholars' Basket of Journals* and ICIS cover the top journals and conferences in the IS field and account for topical, methodological, and geographical diversity. We are confident to have covered large parts of the BPM and IS literature where BPM methods have been published. However, we do not claim completeness, as other publication outlets could have been included in our literature review. Besides, we decided to not include BPM methods from (text)books and/or consulting companies. We critically reflect on the implications of this design decision in Section 6.3, pointing to additional ideas for data collection. As stated in the research method (Section 3), we did not aim for a complete sample of BPM methods, but sampled methods for the validation and demonstration of our CAMAS method. From our perspective, the sample for the evaluation of our artifact is sufficient, as we applied the Assessment Process 226 times (two co-authors assessed each of the 103 identified BPM methods (102 BPM methods from the literature and the CAMAS Method) independently) and later on practitioners considered our results during the Selection Process as suitable and reasonable (Section 5).

We specified the search term (i.e., ("Business Process Management" OR "BPM") AND ("method" OR "model" OR "framework" OR "tool")) and the timeframe starting from 2014 to 2018. Besides the term "method", we included "model," "framework," and "tool" as synonyms. While models are an abstracted presentation of an existing or future situation, frameworks are located at the intersection of models and methods (Verbrugge 2018). Tools, in turn, help execute methods (Dumas et al. 2018). During the development of our search strategy, we tested various search terms and combinations. Amongst others, we considered the term "technique" in the process of identifying the most appropriate search string for our literature review. As its inclusion did not have any implications on the results, we decided to exclude the term for reasons of simplicity. Since "techniques" are defined as detailed instructions related to the execution of method activities (Vanwersch et al. 2016) and therefore overlap with other synonyms, this result is not surprising. We limited the timeframe, as context-aware BPM has gained attention in the past few years, especially with respect to context dimensions (vom Brocke et al. 2016) and the goal of ambidextrous BPM (Kohlborn et al. 2014; vom Brocke and Mendling 2018). We deliberately focused on methodological papers independent of any context.

Applying the search criteria to the selected journals resulted in 2,725 articles. After duplicates had been dropped, 848 articles remained. For the final selection, we applied a multiple-coder approach to examine the titles and abstracts of all articles. Six hundred articles did not match the scope of our research, so 248 articles remained whose full texts were examined in-depth regarding their relevance to our research. We eliminated purely descriptive articles—that is, those that do not propose a BPM method but focused on other forms of inquiry (Lanz et al. 2016; Turetken et al. 2016). At this point, we included all method-

related papers independent of any context. The assessment of the identified methods happened later. In the end, we had 102 relevant articles. Table A-1 presents the number of articles per publication outlet, while Table A-2 lists the respective references of all BPM methods (including IDs) and A-3 summarizes the key ideas of each BPM method.

Table A-1: Results of literature review

Journal/ Conference	total	without duplicates	after title & abstract	after full text
Business & Information Systems Engineering	710	266	47	9
Business Process Management Conference	311	100	40	20
Business Process Management Journal	724	208	69	21
European Conferences on Information Systems	338	92	28	12
European Journal of Information Systems	26	8	0	0
Information Systems	217	68	40	34
Information Systems Journal	92	15	0	0
Information Systems Research	4	1	1	0
International Conferences on Information Systems	234	67	12	5
Journal of Information Technology	17	6	4	0
Journal of Management Information Systems	17	5	3	1
Journal of Strategic Information Systems	3	1	1	0
Journal of the Association for Information Systems	20	8	1	0
Management Information Systems Quarterly	12	3	2	0
SUM	**2725**	**848**	**248**	**102**

Table A-2: ID and references of all identified BPM methods

ID	References
1	Abe M, Kudo M (2014) Business Monitoring Framework for Process Discovery with Real-Life Logs. In: Sadiq S, Soffer P, Völzer H (eds) Proceedings of the 12th International Conference on Business Process Management, pp 416–423
2	Accorsi R, Lehmann A, Lohmann N (2015) Information Leak Detection in Business Process Models: Theory, Application, and Tool Support. Information Systems 47:244–257
3	Anastassiu M, Santoro FM, Recker J, Rosemann M (2016) The Quest for Organizational Flexibility. Business Process Management Journal 22:763–790
4	Antunes AS, Rupino da Cunha P, Barata J (2014) MUVE IT: Reduce the Friction in Business Processes. Business Process Management Journal 20:571–597
5	Appel S, Kleber P, Frischbier S, Freudenreich T, Buchmann A (2014) Modeling and Execution of Event Stream Processing in Business Processes. Information Systems 46:140–156
6	Atkinson C, Gerbig R, Fritzsche M (2015) A Multi-level Approach to Modeling Language Extension in the Enterprise Systems Domain. Information Systems 54:289–307
7	Bala S, Cabanillas C, Mendling J, Rogge-Solti A, Polleres A (2015) Mining Project-oriented Business Processes. In: Motahari-Nezhad HR, Recker J, Weidlich M (eds) Proceedings of the 13th International Conference on Business Process Management, pp 425–440
8	Bala S, Revoredo K, de A.R. Gonçalve, João Carlos, Baião F, Mendling J, Santoro FM (2017) Uncovering the Hidden Co-evolution in the Work History of Software Projects. In: Carmona J., Engels G., Kumar A., Carmona J, Engels G, Kumar A (eds) Proceedings of the 15th International Conference on Business Process Management, pp 164–180
9	Bergener P, Delfmann P, Weiss B, Winkelmann A (2015) Detecting Potential Weaknesses in Business Processes. Business Process Management Journal 21:25–54
10	Bisogno S, Calabrese A, Gastaldi M, Ghiron NL (2016) Combining Modelling and Simulation Approaches. Business Process Management Journal 22:56–74
11	Bolsinger M, Elsäßer A, Helm C, Röglinger M (2015) Process Improvement Through Economically Driven Routing of Instances. Business Process Management Journal 21:353–378
12	Bolt A, de Leoni M, van der Aalst WMP (2018) Process Variant Comparison: Using Event Logs to Detect Differences in Behavior and Business Rules. Information Systems 74:53–66
13	Borkowski M, Fdhila W, Nardelli M, Rinderle-Ma S, Schulte S (2017) Event-Based Failure Prediction in Distributed Business Processes. Information Systems 81:220–235
14	Boubeta-Puig J, Díaz G, Macià H, Valero V, Ortiz G (2017) MEdit4CEP-CPN: An Approach for Complex Event Processing Modeling by Prioritized Colored Petri Nets. Information Systems 81:267–289
15	Breuker D, Matzner M, Delfmann P, Becker J (2016) Comprehensible Predictive Models for Business Processes. MIS Quarterly 40:1009–1034
16	Cabanillas C, di Ciccio C, Mendling J, Baumgrass A (2014) Predictive Task Monitoring for Business Processes. In: Sadiq S, Soffer P, Völzer H (eds) Proceedings of the 12th International Conference on Business Process Management, pp 424–432
17	Cabanillas C, Resinas, M., del-Río-Ortega, A., Ruiz-Cortés, A (2015) Specification and automated design-time analysis of the business process human resource perspective. Information Systems 52:55–82
18	Cuzzocrea A, Folino F, Guarascio M, Pontieri L (2018) Predictive Monitoring of Temporally-aggregated Performance Indicators of Business Processes against Low-level Streaming Events. Information Systems 81:236–266
19	de Boer FG, Müller CJ, Schwengber ten Caten C (2015) Assessment Model for Organizational Business Process Maturity with a Focus on BPM Governance Practices. Business Process Management Journal 21:908–927
20	Debois S, Hildebrandt T, Slaats T (2014) Hierarchical Declarative Modelling with Refinement and Sub-processes. In: Sadiq S, Soffer P, Völzer H (eds) Proceedings of the 12th International Conference on Business Process Management, pp 18–33
21	de Leoni M, Maggi FM, van der Aalst WMP (2015) An Alignment-based Framework to Check the Conformance of Declarative Process Models and to Preprocess Event-log Data. Information Systems 47:258–277
22	de Pádua SID, Mascarenhas Hornos da Costa J, Segatto M, Aparecido de Souza Júnior M, José Chiappetta Jabbour C (2014) BPM for Change Management: Two Process Diagnosis Techniques. Business Process Management Journal 20:247–271
23	del-Río-Ortega A, Resinas M, Durán A, Bernárdez B, Ruiz-Cortés A, Toro M (2017) Visual ppinot: A Graphical Notation for Process Performance Indicators. Business & Information Systems Engineering 5:28
24	Denner M-S, Püschel L, Röglinger M (2018) How to Exploit the Digitalization Potential of Business Processes. Business & Information Systems Engineering 60:1–19
25	Derguech W, Bhiri S, Curry E (2017) Designing Business Capability-aware Configurable Process Models. Information Systems 72:77–94
26	di Francescomarino C, Ghidini C, Maggi FM, Petrucci G, Yeschenko A (2017) An Eye into the Future: Leveraging a-Priori Knowledge in Predictive Business Process Monitoring. In: Carmona J., Engels G., Kumar A., Carmona J, Engels G, Kumar A (eds) Proceedings of the 15th International Conference on Business Process Management, pp 252–268
27	Dijkman R, Wilbik A (2017) Linguistic Summarization of Event Logs – A Practical Approach. Information Systems 67:114–125
28	do Prado Leite JCS, Santoro FM, Cappelli C, Batista TV, Santos FJN (2016) Ownership Relevance in Aspect-oriented Business Process models. Business Process Management Journal 22:566–593
29	Fahland D, Völzer H (2018) Dynamic Skipping and Blocking, Dead Path Elimination for Cyclic Workflows, and a Local Semantics for Inclusive Gateways. Information Systems 78:126–143
30	Fdhila W, Indiono C, Rinderle-Ma S, Reichert M (2015) Dealing with Change in Process Choreographies: Design and Implementation of Propagation Algorithms. Information Systems 49:1–24
31	Fengel J (2014) Semantic Technologies for Aligning Heterogeneous Business Process Models. Business Process Management Journal 20:549–570
32	Fiorentino R (2016) Operations Strategy: A Firm Boundary-Based Perspective. Business Process Management Journal 22:1022–1043

33	Gailly F, Alkhaldi N, Casteleyn S, Verbeke W (2017) Recommendation-based Conceptual Modeling and Ontology Evolution Framework (CMOE+). Business & Information Systems Engineering 59:235–250
34	Gómez-López MT, Gasca RM, Pérez-Álvarez JM (2015) Compliance Validation and Diagnosis of Business Data Constraints in Business Processes at Runtime. Information Systems 48:26–43
35	Graupner E, Schewer C, Maedche A (2015) Visibility of Business Processes: An Information Processing Perspective in the Financial Services Industry. In: Becker J, vom Brocke J, Marco Md (eds) Proceedings of the 23rd European Conference on Information Systems, pp 1–16
36	Hakim A, Gheitasi M, Soltani F (2016) Fuzzy Model on Selecting Processes in Business Process Reengineering. Business Process Management Journal 22:1118–1138
37	Harman J, Brown R, Johnson D, Rinderle-Ma S, Kannengiesser U (2016) Augmenting Process Elicitation with Visual Priming: An Empirical Exploration of User Behaviour and Modelling Outcomes. Information Systems 62:242–255
38	Heinrich B, Schön D (2015) Automated Planning of Context-aware Process Models. In: Becker J, vom Brocke J, Marco Md (eds) Proceedings of the 23rd European Conference on Information Systems, pp 1–22
39	Heinrich B, Schön D (2016) Automated Planning of Process Models: The Construction of Simple Merges. In: Proceedings of the 24th European Conference on Information Systems, pp 1–28
40	Hotie F, Gordijn J (2017) Value-based Process Model Design. Business & Information Systems Engineering 24:163–180
41	Imgrund F, Fischer M, Janiesch C, Winkelmann A (2017) Managing the Long Tail of Business Processes. In: Ramos I, Tuunainen V, Krcmar H (eds) Proceedings of the 25th European Conference on Information Systems, pp 595–610
42	Janiesch C, Diebold J (2016) Conceptual Modeling of Event Process Networks. In: Proceedings of the 24th European Conference on Information Systems, pp 1–15
43	Johannsen F, Fill H-G (2014) Codification of Knowledge in Business Process Improvement Projects. In: Avital M, Leimeister JM, Schultze U (eds) Proceedings of the 22nd European Conference on Information Systems, pp 1–16
44	Jouck T, Depaire B (2018) Generating Artificial Data for Empirical Analysis of Control-Flow Discovery Algorithms. Business & Information Systems Engineering 60:1–18
45	Khlif W, Ben-Abdallah H, Ayed NEB (2017) A Methodology for the Semantic and Structural Restructuring of BPMN Models. Business Process Management Journal 23:16–46
46	Khosravi A (2016) Business Process Rearrangement and Renaming. Business Process Management Journal 22:116–139
47	Knuplesch D, Reichert M, Kumar A (2015) Visually Monitoring Multiple Perspectives of Business Process Compliance. In: Motahari-Nezhad HR, Recker J, Weidlich M (eds) Proceedings of the 13th International Conference on Business Process Management, pp 263–279
48	Knuplesch D, Reichert M, Kumar A (2017) A Framework for Visually Monitoring Business Process Compliance. Information Systems 64:381–409
49	Krumeich J, Werth D, Loos P (2014) Conceiving a Method for Viewpoint-Based Modeling Using Recommender Systems in a Multiple-User Environment: Conceptual Approach and Proof-of-Concept. In: Avital M, Leimeister JM, Schultze U (eds) Proceedings of the 22nd European Conference on Information Systems, pp 1–16
50	La Rosa M, Dumas M, Ekanayake CC, García-Bañuelos L, Recker J, ter Hofstede AHM (2015) Detecting Approximate Clones in Business Process Model Repositories. Information Systems 49:102–125
51	Lanz A, Reichert M (2014) Dealing with Changes of Time-Aware Processes. In: Sadiq S, Soffer P, Völzer H (eds) Proceedings of the 12th International Conference on Business Process Management, pp 217–233
52	Lavikka R, Smeds R, Jaatinen M (2015) A Process for Building Inter-Organizational Contextual Ambidexterity. Business Process Management Journal 21:1140–1161
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54	Lehnert M, Röglinger M, Seyfried J (2018) Prioritization of Interconnected Processes. Business & Information Systems Engineering 60:95–114
55	Leopold H, Mendling J, Reijers HA, La Rosa M (2014) Simplifying Process Model Abstraction: Techniques for Generating Model Names. Information Systems 39:134–151
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58	Linhart A, Manderscheid J, Röglinger M, Schlott H (2015a) Process Improvement Roadmapping: How to Max Out Your Process. In: Carte T, Heinzl A, Urquhart C (eds) Proceedings of the 36th International Conference on Information Systems. Association for Information Systems, pp 1–21
59	Linhart A, Manderscheid J, Röglinger M (2015b) Roadmap to Flexible Service Processes: A Project Portfolio Selection and Scheduling Approach. In: Becker J, vom Brocke J, Marco Md (eds) Proceedings of the 23rd European Conference on Information Systems, pp 1–16
60	Liptchinsky V, Khazankin R, Schulte S, Satzger B, Truong H-L, Dustdar S (2014) On Modeling Context-aware Social Collaboration Processes. Information Systems 43:66–82
61	Low WZ, van der Aalst WMP, ter Hofstede AHM, Wynn MT, de Weerdt J (2017) Change Visualisation: Analysing the Resource and Timing Differences between Two Event Logs. Information Systems 65:106–123
62	Maamar Z, Faci N, Sakr S, Boukhebouze M, Barnawi A (2016) Network-based Social Coordination of Business Processes. Information Systems 58:56–74
63	Maaradji A, Dumas M, La Rosa M, Ostovar A (2015) Fast and Accurate Business Process Drift Detection. In: Motahari-Nezhad HR, Recker J, Weidlich M (eds) Proceedings of the 13th International Conference on Business Process Management, pp 406–422
64	Maggi FM, Slaats T, Reijers HA (2014) The Automated Discovery of Hybrid Processes. In: Sadiq S, Soffer P, Völzer H (eds) Proceedings of the 12th International Conference on Business Process Management, pp 392–399
65	Manderscheid J, Reißner D, Röglinger M (2015) Inspection Coming Due! How to Determine the Service Interval of Your Processes! In: Motahari-Nezhad HR, Recker J, Weidlich M (eds) Proceedings of the 13th International Conference on Business Process Management, pp 19–34

66	Mannhard F, de Leoni M, Reijers HA, van der Aalst WMP, Toussaint PJ (2016) From Low-Level Events to Activities - A Pattern-Based Approach. In: La Rosa M, Loos P, Pastor Ó (eds) Proceedings of the 14th International Conference on Business Process Management, pp 125–141
67	Marjanovic O (2016) Improvement of Knowledge-Intensive Business Processes through Analytics and Knowledge Sharing. In: Ågerfalk PJ, Levina N, Kien SS (eds) Proceedings of the 37th International Conference on Information Systems, pp 1–19
68	Mehdiyev N, Evermann J, Fettke P (2018) A Novel Business Process Prediction Model Using a Deep Learning Method. Business & Information Systems Engineering 13:1–15
69	Meroni G, Baresi L, Montali M, Plebani P (2018) Multi-Party Business Process Compliance Monitoring through IoT-enabled Artifacts. Information Systems 73:61–78
70	Montani S, Leonardi G (2014) Retrieval and Clustering for Supporting Business Process Adjustment and Analy-sis. Information Systems 40:128–141
71	Morana S, Schacht S, Scherp A, Maedche A (2014) Designing a Process Guidance System to Support User's Business Process Guidance. In: Myers MD, Straub DW (eds) Proceedings of the 35th International Conference on Information Systems, pp 1–19
72	Mrasek R, Mülle J, Böhm K (2015) A New Verification Technique for Large Processes Based on Identification of Relevant Tasks. Information Systems 47:82–97
73	Patiniotakis I, Apostolou D, Verginadis Y, Papageorgiou N, Mentzas G (2017) Assessing Flexibility in Event-driven Process Adaptation. Information Systems 81:201–219
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75	Pereira Librelato T, Pacheco Lacerda D, Rodrigues LH, Veit DR (2014) A Process Improvement Approach Based on the Value Stream Mapping and the Theory of Constraints Thinking Process. Business Process Management Journal 20:922–949
76	Pittl B, Fill H-G, Honegger G (2017) Enabling Risk-Aware Enterprise Modeling Using Semantic Annotations and Visual Rules. In: Ramos I, Tuunainen V, Krcmar H (eds) Proceedings of the 25th European Conference on Information Systems, pp 326–351
77	Polpinij J, Ghose A, Dam HK (2015) Mining Business Rules from Business Process Model Repositories. Business Process Management Journal 21:820–836
78	Ponce-de-León H, Carmona J, vanden Broucke, Seppe K. L. M. (2015) Incorporating Negative Information in Process Discovery. In: Motahari-Nezhad HR, Recker J, Weidlich M (eds) Proceedings of the 13th International Conference on Business Process Management, pp 126–143
79	Rangiha ME, Comuzzi M, Karakostas B (2016) A Framework to Capture and Reuse Process Knowledge in Business Process Design and Execution Using Social Tagging. Business Process Management Journal 22:835–859
80	Redlich D, Molka T, Gilani W, Blair G, Rashid A (2014) Constructs Competition Miner: Process Control-Flow Discovery of BP-Domain Constructs. In: Sadiq S, Soffer P, Völzer H (eds) Proceedings of the 12th International Conference on Business Process Management, pp 134–150
81	Rehse J-R, Fettke P, Loos P (2016) An Execution-Semantic Approach to Inductive Reference Model Development. In: Proceedings of the 24th European Conference on Information Systems, pp 1–16
82	Rocha R, Fantinato M, Thom LH, Eler MM (2015) Dynamic Product Line for Business Process Management. Business Process Management Journal 21:1224–1256
83	Rogge-Solti A, Weske M (2015) Prediction of Business Process Durations Using Non-Markovian Stochastic Petri Nets. Information Systems 54:1–14
84	Ruiz M, Costal D, España S, Franch X, Pastor Ó (2015) GoBIS: An Integrated Framework to Analyse the Goal and Business Process Perspectives in Information Systems. Information Systems 53:330–345
85	Saldivar J, Vairetti C, Rodríguez C, Daniel F, Casati F, Alarcón R (2016) Analysis and Improvement of Business Process Models Using Spreadsheets. Information Systems 57:1–19
86	Satyal S, Weber I, Paik H-y, di Ciccio C, Mendling J (2018) Business Process Improvement with the AB-BPM Methodology. Information Systems
87	Seeliger A, Nolle T, Schmidt B, Mühlhäuser M (2016) Process Compliance Checking Using Taint Flow Analysis. In: Ågerfalk PJ, Levina N, Kien SS (eds) Proceedings of the 37th International Conference on Information Systems, pp 1–18
88	Senderovich A, Weidlich M, Gal A, Mandelbaum A (2014) Mining Resource Scheduling Protocols. In: Sadiq S, Soffer P, Völzer H (eds) Proceedings of the 12th International Conference on Business Process Management, pp 200–216
89	Senderovich A, di Francescomarino C, Ghidini C, Jorbina K, Maggi FM (2017) Intra and Inter-case Features in Predictive Process Monitoring: A Tale of Two Dimensions. In: Carmona J., Engels G., Kumar A., Carmona J, Engels G, Kumar A (eds) Proceedings of the 15th International Conference on Business Process Management, pp 306–323
90	Senderovich A, Shleyfman A, Weidlich M, Gal A, Mandelbaum A (2018) To Aggregate or to Eliminate? Optimal Model Simplification for Improved Process Performance Prediction. Information Systems 78:96–111
91	Simões D, Antunes P, Carriço L (2018) Eliciting and Modeling Business Process Stories. Business & Information Systems Engineering 60:115–132
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93	Tax N, Dalmas B, Sidorova N, van der Aalst WMP, Norre S (2018) Interest-Driven Discovery of Local Process Models. Information Systems 77:105–117
94	Teinemaa I, Dumas M, Maggi FM, di Francescomarino C (2016) Predictive Business Process Monitoring with Structured and Unstructured Data. In: La Rosa M, Loos P, Pastor Ó (eds) Proceedings of the 14th International Conference on Business Process Management, pp 401–417
95	Trkman P, Mertens W, Viaene S, Gemmel P (2015) From Business Process Management to Customer Process Management. Business Process Management Journal 21:250–266
96	van Beest NRTP, Dumas M, García-Bañuelos L, La Rosa M (2015) Log Delta Analysis: Interpretable Differencing of Business Process Event Logs. In: Motahari-Nezhad HR, Recker J, Weidlich M (eds) Proceedings of the 13th International Conference on Business Process Management, pp 386–405
97	van der Aa H, Leopold H, Reijers HA (2017) Comparing Textual Descriptions to Process Models – The Automatic Detection of Inconsistencies. Information Systems 64:447–460

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99	Wang N, Sun S, OuYang D (2018) Business Process Modeling Abstraction based on Semi-Supervised Clustering Analysis. Business & Information Systems Engineering 60:525–542
100	Yongchareon S, liu C, Yu J, Zhao X (2015) A View Framework for Modeling and Change Validation of Artifact-Centric Inter-Organizational Business Processes. Information Systems 47:51–81
101	Zahoransky R, Holderer J, Lange A, Brenig C (2016) Process Analysis as First Step Towards Automated Business Security. In: Proceedings of the 24th European Conference on Information Systems, pp 1–15
102	Zhu X, Recker J, Zhu G, Santoro FM (2014) Exploring Location-Dependency in Process Modeling. Business Process Management Journal 20:794–815

Table A-3: List of all identified BPM methods

ID	Key idea (the BPM method helps organizations to…)
1	Extract process instances and derive appropriate metrics to improve business performance.
2	Verify information flow control for business process models.
3	Identify contextual factors which impact processes and their process goals to adapt these.
4	Assess the social sustainability of processes to diagnose participants resist following modeled process.
5	Encapsulate event stream processing as business functions.
6	Support for implementing language extensions in modeling tools.
7	Generate compliance processes models that visualize the work history as GANTT charts.
8	Mine processes in software development projects to identify dependencies between artifacts.
9	Automatically detect potential process weaknesses in semantic process models.
10	Use modeling and simulation standards to measure process key performance indicators and test improvements.
11	Derive concrete recommendations for process improvement in a goal-oriented manner.
12	Model process behavior and detect differences of variants of the same process.
13	Detect and respond to unforeseen process events.
14	Facilitate the modeling, simulation, analysis and semantic validation of complex event-based systems.
15	Predict the behavior of future processes based on past behavior.
16	Control the safe execution of tasks and signals possible misbehaviors at runtime.
17	Automatically analyze gaps concerning human resource management in business processes.
18	Predict performance requirement violation of process instances.
19	Assess the maturity of BPM governance practices to identify activities for improvement.
20	Facilitate incremental refinement, adaptation of processes, and dynamic creation of sub-processes.
21	Provide sophisticated diagnostics by aligning event logs and predefined declarative process models.
22	Facilitate organizational change through BPM.
23	Graphically represent process performance indicators together with process models.
24	Exploit digitalization potential of business processes.
25	Design business capability-aware configurable process models.
26	Include a-priori knowledge of processes to predict the sequence of future activities of ongoing processes.
27	Generate linguistic summaries of event logs that are concise enough to be used in practical settings.
28	Provide transparency concerning process ownership.
29	Define dead-path-elimination for cyclic workflows.
30	Propagate private process changes and preserves consistency and compatibility of the process choreography.
31	Systematically and automatically analyze and match conceptual legacy process models in different languages.
32	Create value and improve efficiency based on analyzing strategic operations.
33	Facilitate model integration and make conceptual models interoperable.
34	Write and validate business data constraints in run-time from a business expert perspective.
35	Identify promising investments in visibility-creating technologies in a process environment.
36	Select suitable processes according to organizational objectives for a Business Process Reengineering project.
37	Role play actual process stakeholders and specifications in a virtual world.
38	Automatically plan context-aware process models which consider static and non-static context information.
39	Automatically construct a control flow structure.
40	Design process models for networked value constellations.
41	Optimize low-value processes to facilitate a holistic management of the organization’s entire business processes.
42	Design event processing networks prior deciding for a complex event processing product.
43	Coordinate business process improvement techniques in a business process improvement project.
44	Generate artificial event data and receive full control over the generated data characteristics.
45	Reduce complexity of an initial BPMN model.
46	Achieve a process-oriented structure without destroying existing department structures.
47	Detect process compliance violations.
48	Monitor business process compliance and highlight corresponding causes.
49	Use stakeholder-specific viewpoints on collaborative process modeling.
50	Retrieve process clones and enhance process standardization.
51	Guarantee temporal consistency of changed process instances.
52	Build ambidexterity into inter-organizational IT-enabled service processes to meet the needs of their customers.
53	Evaluate and select proper BPM roadmaps for business process improvements.
54	Prioritize processes for improvement based on the process' individual need for improvement and the interconnectedness with other processes.
55	Automatically name business process models and fragments.
56	Discover sound process models from event logs.
57	Understand its role in the value creation process.
58	Decide which process improvement roadmap is in line with the principles of project portfolio selection and value-based management.
59	Determine an optimal process flexibility roadmap.

60	Visualize social collaboration processes.
61	Compare and visualize the differences between two process logs.
62	Coordinate conflicts over resources during process execution.
63	Automatically detect process drift.
64	Generate hybrid process model as a mix of declarative and procedural model elements–from event logs.
65	Predict after which number of executed instances a process should undergo an in-depth analysis.
66	Capture domain knowledge on the relation between activities and events.
67	Improve business intelligence and analytic supporting knowledge-intensive business processes on an ongoing base.
68	Predict an upcoming process event from previous completed activities.
69	Monitor the compliance of the execution of multi-party business processes.
70	Support run-time adjustment and a posteriori analysis of business processes.
71	Guide users through process compliance.
72	Support the verification of process compliance by identifying relevant tasks for verification.
73	Foster the ability to deal with both foreseen and unforeseen changes in business processes.
74	Identify the date on which a process change occurred as well as the relative magnitude of the change.
75	Provide an overview of process losses and corresponding prioritization steps for its elimination.
76	Support the identification and documentation of risks in an organization and the definition of measures for their mitigation.
77	Extract business rules from existing process models.
78	Derive process models which are not only simple, fitting and precise, but also good on generalizing the right behavior.
79	Capture process knowledge to improve user collaboration and manage ad hoc and semi-structured processes.
80	Mine process models which consist of common business process domain constructs and represents the main behavior of the process.
81	Derive inductive reference models including the behavior of input models rather than their design.
82	Systematize operational processes for managing and improving processes.
83	Detect undesired deviations to react accordingly.
84	Facilitate the traceability between goal and business process models.
85	Provide necessary instruments to analyze processes.
86	Facilitate process improvement validation.
87	Check whether the actual ‘as-is’ process graph violates against compliance constraints.
88	Automatically learn about resource decisions from process events.
89	Enhance predictive process monitoring accounting for intra-case and inter-case dependencies.
90	Enhance discovery algorithms by including design choices in terms of performance measures.
91	Elicit process stories by means of textual and visual elements.
92	Improve the cognitive effectiveness of BPMN-models.
93	Discover goal-driven local-process models based on utility functions and constraints.
94	Handle structured and unstructured event payloads for process monitoring.
95	Understand the customer needs and integrate the organizations’ products and services into customer processes.
96	Identify and explain behavioral differences between two business process event logs.
97	Discover inconsistencies between a process model and its textual description.
98	Check for possible interpretations of process descriptions.
99	Enhance cluster analysis for process model abstraction.
100	Model and validate changes of inter-organizational business processes.
101	Automatically check whether a process contradicts with compliance or not.
102	Extend context-aware process modeling towards location-awareness to increase organizational objectives.

Appendix 2 - Calculation of Cohen's Kappa, *DCS*, and *DA*

To better understand how the indicators *Cohen's Kappa*, *degree of context specificity* (*DCS*, Section 4.3 and 5.1), and *degree of applicability* (*DA*, Section 4.4 and 5.2) are calculated, we provide equations, required input values, and exemplary calculations below.

(1) Cohen's Kappa (Cohen 1960)

Cohen's Kappa measures the agreement between two raters where each rater classifies *N* items into mutually exclusive categories. κ is defined as:

$$\kappa = \frac{p_o - p_e}{1 - p_e} = 1 - \frac{1 - p_o}{1 - p_e}$$

with $p_o =$ proportion of units in which the raters agreed

$p_e =$ proportion of units for which agreement is expected by chance

Expressed in frequencies to facilitate computation:

$$\kappa = \frac{f_o - f_e}{N - f_e}$$

with $f_o =$ amount of units in which the raters agreed

$f_e =$ amount of units for which agreement is expected by chance

$N =$ amount of units to be assessed

We calculated Cohen's Kappa for each BPM method as shown in the following example. When classifying the BPM method proposed by Antunes et al. (2014), two co-authors assessed that method as shown in Figure A-1.

Accordingly, the Cohen's Kappa is calculated as follows:

$$\kappa = \frac{(26 - 20)}{(29 - 20)} = 0.67 \qquad \text{with } f_o = 26,\ f_e = 20, \text{ and } N = 29$$

Antunes et al. 2014			Author 1	Author 2	Agreement
Process dimension	Value contribution	Core process	–	–	TRUE
		Management process	–	–	TRUE
		Support process	–	–	TRUE
	Repetitiveness	Repetitive	a	–	FALSE
		Non-repetitive	–	–	TRUE
	Knowledge intensity	Low knowledge-intensity	–	–	TRUE
		High knowledge-intensity	–	–	TRUE
	Creativity	Low creativity	–	–	TRUE
		High creativity	–	–	TRUE
	Interdependence	Low interdependence	–	–	TRUE
		High interdependence	a	a	TRUE
	Variability	Low variability	–	–	TRUE
		High Variablity	–	a	FALSE
Organization dimension	Scope	Intra-organizational processes	a	a	TRUE
		Inter-organizational processes	–	–	TRUE
	Industry	Product industry	–	–	TRUE
		Service Industry	–	–	TRUE
		Product & Service Industry	–	–	TRUE
	Size	Start-up	–	–	TRUE
		Small and medium enterprise	–	–	TRUE
		Large Organization	–	–	TRUE
	Culture	Culture highly supportive of BPM	a	a	TRUE
		Culture non-supportive of BPM	na	–	FALSE
	Resources	Low organizational resources	–	–	TRUE
		High organizational resources	a	a	TRUE
Environment dimension	Competitiveness	Low competetive environment	–	–	TRUE
		High competetive environment	–	–	TRUE
	Uncertainty	Low environmental uncertainty	–	–	TRUE
		High environmental uncertainty	–	–	TRUE

		Cohen Kap.	0.67	*(Reliability)*

Author 1	**Author 2**			**Sum**
	1	3	5	
1	0	1	0	**1**
3	0	22	1	**23**
5	0	1	4	**5**
Sum	**0**	**24**	**5**	**29**
Agreement	0	22	4	**26**
By Chance	0.00000	19.034	0.862	**20**

Figure A-1: Calculation results Cohen's Kappa (BPM method by Antunes et al. 2014)

(2) Degree of context specificity (*DCS*) (BPM method by Antunes et al. 2014)

To assess the context specificity of a given BPM method and to classify whether this method follows a special or a general purpose, we defined the degree of context specificity (*DCS*). As for Cohen's Kappa, an exemplary calculation of the *DCS* according to Eq. (1) (Section 4.3) for the BPM method by Antunes et al. (2014) is shown in Figure A-2.

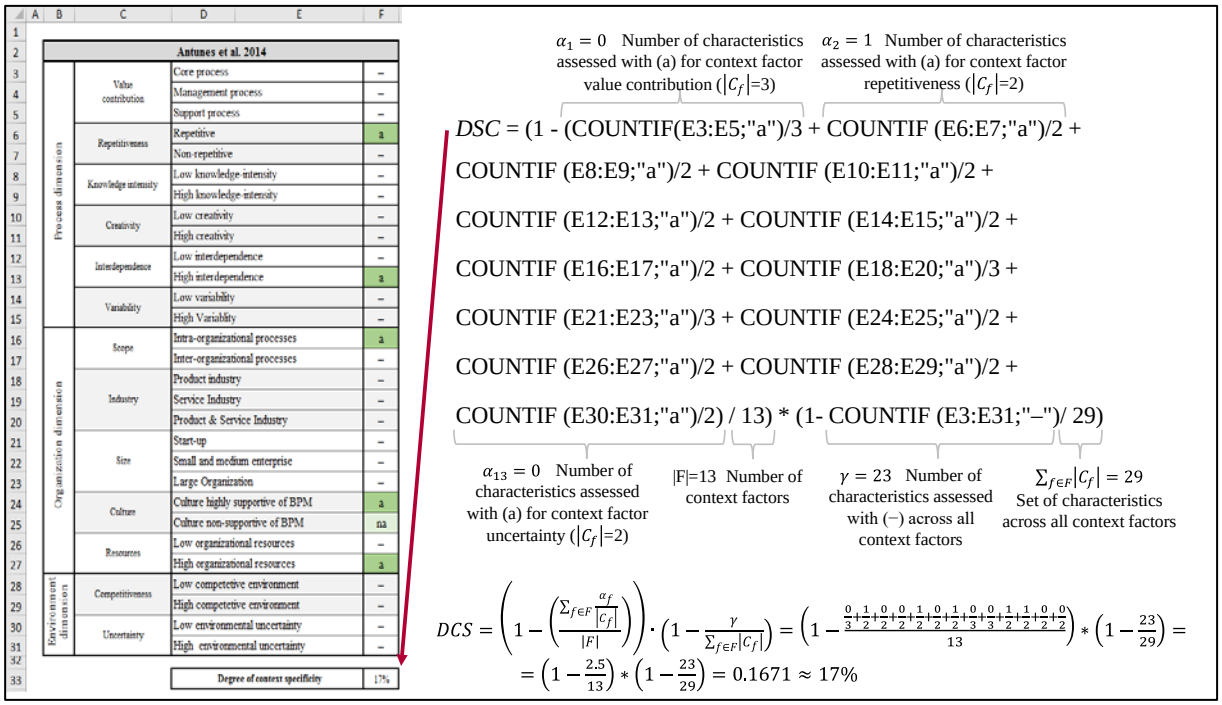

Figure A-2: Calculation results for *DCS* (BPM method by Antunes et al. 2014)

(3) Degree of applicability (*DA*) (BPM method by Antunes et al. 2014 for process P6)

To assess the extent to which a given BPM method is applicable to a given context (i.e., how often the criteria (a) or (na) match the specified context), we defined the degree of applicability (*DA*). In case a BPM method has not been assessed by the original method engineer, we offer two calculation modes. In the risk-averse mode, all (−) are treated as (na), i.e., context characteristics which could not be assessed based on publicly available data are treated as if the method were not applicable. By contrast, all (−) are treated as (a) in the risk-taking mode. Subsequently, all (a) values are replaced by 1 and all (na) values by 0. Again, we provide an exemplary calculation for the *DA* according to Eq. (2) (Section 4.4) following the risk-averse calculation modus in Figure A-3, which assess whether the BPM method by Antunes et al. (2014) is applicable for the context of process P6 (Section 5.2).

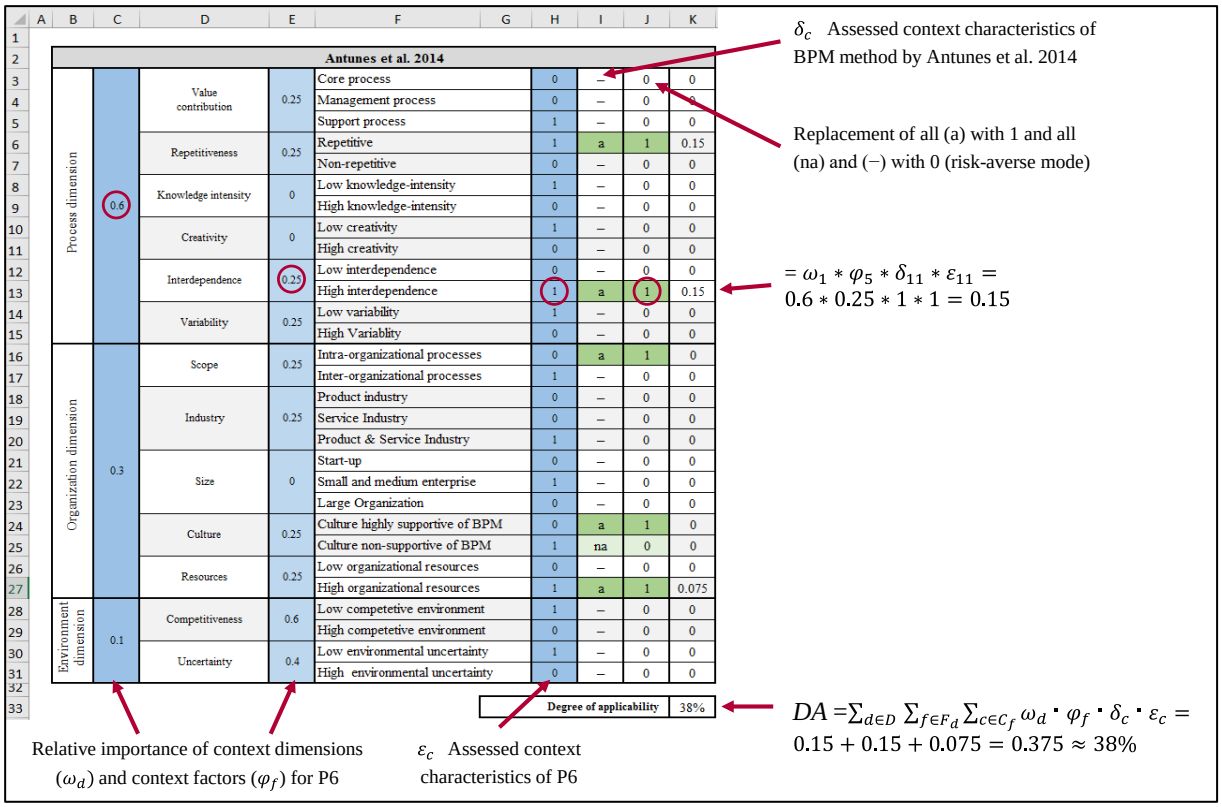

Figure A-3: Calculation results for *DA* following the risk-averse mode (BPM method by Antunes et al. 2014 for process P6)

Appendix 3 – Results applying the Assessment Process to a sample of 103 BPM methods

				Context dimension (see Activity A4)																																Indicator	Reliability
				Process dimension															Organization dimension																		Environment dimension					
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty									
ID	Author	Lifecycle dimension (see Activity A2)	Goal dimension (see Activity A3)	Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty							Degree of context specificity (DCS)	Cohen's Kappa
3	Anastassiu et al. 2016	Design	Exploitation	a	–	–	a	–	-	–	–	–	–	a	–	a	a	–	–	–	–	–	–	–	a	–	–	–	–	–	a							21%	67%
5	Appel et al. 2014	Design	Exploitation	–	–	–	a	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							10%	79%
6	Atkinson et al. 2015	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–							7%	65%
14	Boubeta-Puig et al. 2017	Design	Exploitation	–	–	–	–	–	–	a	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							9%	72%
17	Cabanillas et al. 2015	Design	Exploitation	–	–	–	–	–	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							6%	65%
20	de Leoni et al. 2015	Design	Exploitation	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							3%	100%
22	Debois et al. 2014	Design	Exploitation	–	–	–	a	–	a	–	a	–	a	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							17%	79%
23	del-Río-Ortega et al. 2017	Design	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	–	–	na	–	a	a	–	–	–	a	–	–	–	–	–	–							18%	63%
25	Derguech et al. 2017	Design	Exploitation	–	–	–	a	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							6%	65%
28	do Prado Leite et al. 2016	Design	Exploitation	–	–	–	a	–	–	a	–	a	–	a	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–							14%	71%
29	Fahland and Völzer 2018	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	a	–	a	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–							9%	71%
31	Fengel 2014	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	na	–	a	a	na	–	–	–	–	–							19%	91%
33	Gailly et al. 2017	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–							7%	79%
37	Harman et al. 2016	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–							3%	65%
38	Heinrich and Schön 2015	Design	Exploitation	–	–	–	–	–	–	a	–	a	–	a	–	na	–	a	–	–	–	–	–	–	–	–	–	–	–	a	–	a						19%	74%
39	Heinrich and Schön 2016	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	a	na	–	–	–	–	na	a						15%	72%
40	Hotie and Gordijn 2017	Design	Exploitation	a	–	–	–	–	–	–	–	–	–	–	–	–	–	na	–	a	a	–	–	–	–	a	–	–	–	–	–	–						15%	80%
42	Janiesch and Diebold 2016	Design	Exploitation	–	–	–	–	–	–	a	–	a	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	a						16%	61%
44	Jouck and Depaire 2018	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	na	–	–	–	–	–	–	–	–	–	–						3%	65%
49	Krumeich et al. 2014	Design	Exploitation	a	a	–	–	–	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	a	a	–	–	–	–	–	–							17%	89%
50	La Rosa et al. 2015	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–							10%	84%
55	Leopold et al. 2014	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	na	–	a	–	–	–	–	–	–	–							10%	64%
56	Liesaputra et al. 2015	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–							9%	63%
60	Liptchinsky et al. 2014	Design	Exploitation	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							3%	65%
64	Maggi et al. 2014	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							3%	100%
72	Mrasek et al. 2015	Design	Exploitation	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							3%	65%
76	Pittl et al. 2017	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	a						6%	65%
78	Ponce-de-León et al. 2015	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							3%	65%
80	Redlich et al. 2014	Design	Exploitation	a	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	a	–	–	–	–	–							12%	64%
81	Rehse et al. 2016	Design	Exploitation	–	–	–	–	–	–	na	–	na	na	–	–	na	a	na	–	–	–	na	–	–	–	na	–	–	–	–	–							30%	83%
84	Ruiz et al. 2015	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	a	–	a						9%	100%
91	Simões et al. 2018	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	a	–	–	–	–	–							10%	79%
92	Stark and Esswein 2017	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							6%	65%
97	van der Aa et al. 2017	Design	Exploitation	–	–	–	–	–	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	a	a	–	–	–	–	–	–							12%	61%
99	Wang et al. 2018	Design	Exploitation	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							3%	100%
100	Yongchareon et al. 2015	Design	Exploitation	a	–	a	–	–	–	–	–	–	–	–	–	–	na	a	–	–	–	–	–	–	a	na	–	–	–	–	–							18%	77%
102	Zhu et al. 2014	Design	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	a	–	a						12%	77%

a applicable to a specific context characteristic | na not applicable to a specific context characteristic | – applicability is not assessable

Figure A-4: Exploitative BPM methods related to the design stage of the BPM lifecycle

				Process dimension														Organization dimension														Environment dimension				Indicator	Reliability
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability			Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty			
ID	Author	Lifecycle dimension (see Activity A2)	Goal dimension (see Activity A3)	Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability		Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of context specificity (DCS)	Cohen`s Kappa
30	Fdhila et al. 2015	Implementation	Exploitation	a	–	a	–	–	–	–	–	–	–	–	–	–		na	a	–	–	–	a	–	–	–	–	–	–	–	–	–	–	15%	77%
43	Johannsen and Fill 2014	Implementation	Exploitation	–	–	–	–	–	na	a	na	a	–	–	na	a		na	a	–	–	–	–	–	–	a	–	–	a	–	–	–	–	27%	76%
51	Lanz and Reichert 2014	Implementation	Exploitation	a	–	–	–	–	–	–	–	–	–	–	a	na		–	–	–	–	–	–	–	–	–	–	–	–	–	–	na	a	15%	62%
57	Lindman et al. 2016	Implementation	Exploitation	a	na	na	–	–	–	–	–	–	–	–	–	–		a	–	–	–	–	–	–	–	–	–	–	–	na	a	na	a	24%	76%
62	Maamar et al. 2016	Implementation	Exploitation	–	–	–	–	–	–	a	–	–	–	–	–	–		a	–	–	–	–	–	–	–	a	–	–	–	–	–	–	a	12%	76%
71	Morana et al. 2014	Implementation	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a		a	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	9%	78%
79	Rangiha et al. 2016	Implementation	Exploitation	–	–	–	na	–	–	a	–	a	–	–	na	a		a	–	–	–	–	–	–	–	a	–	–	a	–	–	–	–	23%	74%
95	Trkman et al. 2015	Implementation	Exploitation	a	na	na	–	–	–	–	–	–	–	–	–	–		na	a	–	–	a	–	–	–	a	–	–	–	–	a	–	–	23%	85%

a applicable to a specific context characteristic na not applicable to a specific context characteristic – applicability is not assessable

Figure A-5: Exploitative BPM methods related to the implementation stage of the BPM lifecycle

				Context dimension (see Activity A4)																																					
				Process dimension														Organization dimension												Environment dimension				Indicator	Reliability
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty			
ID	Author	Lifecycle dimension (see Activity A2)	Goal dimension (see Activity A3)	Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of context specificity (DCS)	Cohen`s Kappa
1	Abe and Kudo 2014	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	a	–	–	–	–	6%	78%
2	Accorsi et al. 2015	Monitoring	Exploitation	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3%	65%
7	Bala et al. 2015	Monitoring	Exploitation	a	–	–	a	–	–	–	–	–	–	–	–	–	–	–	a	na	a	–	–	–	–	–	–	–	–	–	–	15%	68%
8	Bala et al. 2017	Monitoring	Exploitation	–	–	–	–	–	–	a	–	a	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12%	63%
11	Bolsinger et al. 2015	Monitoring	Exploitation	–	–	–	a	na	–	–	–	–	–	na	–	a	a	–	–	–	–	na	–	–	–	–	–	a	–	–	–	20%	69%
12	Bolt et al. 2018	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	na	a	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	10%	79%
13	Borkowski et al. 2017	Monitoring	Exploitation	a	–	–	a	–	–	–	–	–	–	–	–	–	na	a	–	–	–	–	–	–	a	–	–	–	–	–	–	15%	62%
15	Breuker et al. 2016	Monitoring	Exploitation	a	na	–	a	na	–	–	–	–	a	–	a	–	a	na	–	–	–	na	–	a	a	na	na	a	–	a	–	a	35%	89%
16	Cabanillas et al. 2014	Monitoring	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7%	79%
18	Cuzzocrea et al. 2018	Monitoring	Exploitation	–	–	–	a	–	–	–	–	–	a	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	a	14%	71%
26	di Francescomarino et al. 2017	Monitoring	Exploitation	–	–	–	a	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10%	79%
27	Dijkman and Wilbik 2017	Monitoring	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	a	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12%	64%
34	Gómez-López et al. 2015	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	6%	65%
35	Graupner et al. 2015	Monitoring	Exploitation	–	–	–	–	–	–	a	–	a	–	a	–	na	–	–	na	a	a	–	–	–	–	–	–	–	–	–	–	20%	61%
47	Knuplesch et al. 2015	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	7%	79%
48	Knuplesch et al. 2017	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	7%	64%
63	Maaradji et al. 2015	Monitoring	Exploitation	–	–	–	a	–	–	a	–	a	–	a	na	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	19%	91%
66	Mannhard et al. 2016	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3%	65%
67	Marjanovic 2016	Monitoring	Exploitation	a	–	–	–	–	na	a	–	–	–	–	–	–	–	–	–	–	–	na	–	a	–	–	–	–	–	a	–	a	20%	80%
68	Mehdiyev et al. 2018	Monitoring	Exploitation	–	–	–	a	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10%	72%
69	Meroni et al. 2018	Monitoring	Exploitation	a	na	na	–	–	–	–	–	–	–	–	–	–	na	a	–	–	–	–	–	–	–	–	–	–	–	–	–	a	19%	91%
70	Montani and Leonardi 2014	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	3%	65%
73	Patiniotakis et al. 2017	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	na	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	10%	100%
74	Pentland et al. 2014	Monitoring	Exploitation	–	–	–	a	–	a	–	a	–	a	na	a	na	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	24%	79%
83	Rogge-Solti and Weske 2015	Monitoring	Exploitation	a	na	na	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	19%	91%
85	Saldivar et al. 2016	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	7%	100%
86	Satyal et al. 2018	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	na	–	–	a	–	–	–	–	–	–	13%	87%
87	Seeliger et al. 2016	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3%	100%
88	Senderovich et al. 2014	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	na	–	–	a	na	–	–	–	–	–	10%	64%
89	Senderovich et al. 2017	Monitoring	Exploitation	a	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	a	a	–	–	–	a	na	–	–	–	–	–	18%	68%
90	Senderovich et al. 2018	Monitoring	Exploitation	–	–	–	–	–	–	a	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9%	100%
94	Teinemaa et al. 2016	Monitoring	Exploration	–	–	–	–	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	10%	63%
96	van Beest et al. 2015	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6%	65%
98	van der Aa et al. 2018	Monitoring	Exploitation	–	–	–	a	–	–	a	–	a	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	14%	71%
101	Zahoransky et al. 2016	Monitoring	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	a	a	–	a	a	–	–	–	–	15%	71%

a applicable to a specific context characteristic na not applicable to a specific context characteristic – applicability is not assessable

Figure A-6: Exploitative BPM methods related to the monitoring stage of the BPM lifecycle

				Context dimension (see Activity A4)																														Indicator	Reliability
				Process dimension														Organization dimension												Environment dimension						
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty			
ID	Author	Lifecycle dimension (see Activity A2)	Goal dimension (see Activity A3)	Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of context specificity (DCS)	Cohen`s Kappa
4	Antunes et al. 2014	Improvement and innovation	Exploitation	–	–	–	a	–	–	–	–	–	–	a	–	–	a	–	–	–	–	–	–	–	a	na	–	a	–	–	–	–	17%	67%
9	Bergener et al. 2015	Improvement and innovation	Exploitation	–	–	–	a	na	–	–	–	–	–	–	a	na	a	na	–	–	–	na	–	a	a	na	na	a	–	a	–	a	34%	82%
10	Bisogno et al. 2016	Improvement and innovation	Exploitation	a	–	–	a	–	–	–	–	a	–	–	a	–	a	na	–	–	–	–	–	a	a	na	–	–	–	–	–	–	26%	65%
21	de Pádua et al. 2014	Improvement and innovation	Exploitation	–	–	–	a	–	–	a	–	–	–	a	–	a	a	na	–	–	–	–	–	–	a	–	–	–	–	–	–	–	19%	71%
24	Denner et al. 2018	Improvement and innovation	Exploitation	a	na	a	a	–	–	–	–	–	–	–	–	na	a	na	a	a	a	na	a	a	a	–	na	a	na	a	na	a	41%	94%
41	Imgrund et al. 2017	Improvement and innovation	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	3%	100%
45	Khlif et al. 2017	Improvement and innovation	Exploitation	–	–	–	a	–	–	–	–	–	–	a	–	–	a	–	–	–	–	–	a	a	a	–	–	a	–	–	–	–	18%	84%
46	Khosravi 2016	Improvement and innovation	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	a	–	–	–	na	–	a	a	na	na	a	na	a	–	–	27%	100%
61	Low et al. 2017	Improvement and innovation	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3%	65%
75	Pereira Librelato et al. 2014	Improvement and innovation	Exploitation	a	na	na	a	–	–	–	–	–	–	–	–	na	a	na	a	na	a	–	–	–	–	–	–	–	–	a	–	–	31%	62%
77	Polpinij et al. 2015	Improvement and innovation	Exploitation	a	na	–	a	–	–	–	–	–	–	a	a	–	a	na	–	–	–	na	–	a	a	na	na	a	–	a	–	–	35%	83%
93	Tax et al. 2018	Improvement and innovation	Exploitation	–	–	–	–	–	–	–	–	–	–	a	–	a	–	–	–	–	–	–	–	–	a	–	–	–	–	a	–	–	14%	89%

a applicable to a specific context characteristic na not applicable to a specific context characteristic – applicability is not assessable

Figure A-7: Exploitative BPM methods related to the improvement and innovation stage of the BPM lifecycle

				Context dimension (see Activity A4)																																			
				Process dimension														Organization dimension														Environment dimension				Indicator	Reliability
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty			
ID	Author	Lifecycle dimension (see Activity A2)	Goal dimension (see Activity A3)	Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of context specificity (DCS)	Cohen`s Kappa
103	CAMAS Method	Project management	Exploitation	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	0%	100%
19	de Boer et al. 2015	Project management	Exploitation	–	a	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	na	–	a	a	na	–	–	–	–	–	–	21%	71%
32	Fiorentino 2016	Project management	Exploitation	–	a	–	–	–	–	–	–	–	–	–	–	–	a	a	–	–	–	–	–	–	–	–	–	–	–	a	–	–	12%	67%
36	Hakim et al. 2016	Project management	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	a	–	–	a	–	a	–	–	15%	68%
52	Lavikka et al. 2015	Project management	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	na	a	na	a	na	–	–	–	a	na	–	–	–	a	–	a	25%	81%
53	Lehnert et al. 2014	Project management	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	a	–	–	a	–	–	–	–	15%	67%
54	Lehnert et al. 2018	Project management	Exploitation	a	–	a	–	–	–	–	–	–	na	a	na	a	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20%	92%
58	Linhart et al. 2015a	Project management	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	3%	100%
59	Linhart et al. 2015b	Project management	Exploitation	a	na	na	na	–	–	–	–	–	–	–	na	a	–	–	na	a	a	–	–	–	–	–	–	–	–	–	na	a	33%	77%
65	Manderscheid et al. 2015	Project management	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6%	65%
82	Rocha et al. 2015	Project management	Exploitation	na	a	na	a	–	–	–	–	–	–	–	a	na	a	na	–	–	–	–	–	–	–	–	na	a	–	a	–	–	32%	94%

a applicable to a specific context characteristic na not applicable to a specific context characteristic – applicability is not assessable

Figure A-8: Exploitative BPM methods related to the project management stage of the BPM lifecycle

				Context dimension (see Activity A4)																																					
				Process dimension																																					
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty		Indicator	Reliability
ID	Author	Lifecycle dimension (see Activity A2)	Goal dimension (see Activity A3)	Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of context specificity (DCS)	Cohen`s Kappa
5	Appel et al. 2014	Design	Exploration	–	–	–	a	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10%	79%
84	Ruiz et al. 2015	Design	Exploration	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	a	–	a	9%	100%
57	Lindman et al. 2016	Implementation	Exploration	a	na	na	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	na	a	na	a	24%	76%
95	Trkman et al. 2015	Implementation	Exploration	a	na	na	–	–	–	–	–	–	–	–	–	–	na	a	–	–	a	–	–	–	a	–	–	–	–	a	–	–	23%	85%

a applicable to a specific context characteristic

na not applicable to a specific context characteristic

– applicability is not assessable

Figure A-9: Explorative BPM methods related to all stages of the BPM lifecycle

Appendix 4 – Questionnaire for applying the Assessment Process

Lifecycle dimension

For which BPM lifecycle stage is your BPM method applicable (multiple answers possible)?

BPM lifecycle stage	Definition	Assess your method (please insert "x")
Design & modelling	• Conceptualize as-is and to-be processes	
Implementation & execution	• Create executable specifications	
Monitoring & control	• Collect and consolidate process data • Monitor the execution of processes	
Improvement & innovation	• Develop improved business processes • Radically change existing or create new processes	
Project & program management	• Evaluate the methods that are used for enterprise-wide BPM and specific BPM projects	

Goal dimension

For which BPM goal is your BPM method applicable (multiple answers possible)?

BPM goal	Definition	Assess your method (please insert "x")
Exploitation	Exploitative BPM is inward-looking and problem-driven, striving for efficiency through the continuous improvement of existing business processes.	
Exploration	Explorative BPM is outward-looking and opportunity-driven, striving for increased future revenue through the business process innovation.	

Context dimension

For which BPM context is your BPM method applicable? Please determine for each context characteristic whether your BPM method is applicable or is not applicable (*Note: For each context factor, e.g., value contribution, at least one characteristic must be assessed with "a"; all other characteristics can then be assessed with "a" or "na*"):

- (a): the BPM method **a**pplies to a specific context characteristic.
- (na): the BPM method is **n**ot **a**pplicable to a specific context characteristic.

Context factor		Definition	Context characteristics	Assess your method (please insert "a" or "na")
Process dimension	Value contribution	Value a process creates for internal or external customers	Core process	
			Management process	
			Support process	
	Repetitiveness	Execution frequency of a process	Repetitive	
			Non-repetitive	

	Knowledge intensity	Knowledge a process requires from process participants	Low knowledge-intensity	
			High knowledge-intensity	
	Creativity	Creativity a process requires from process participants	Low creativity	
			High creativity	
	Interdepen-dence	Relationships among processes	Low interdependence	
			High interdependence	
	Variability	Amount of variants of a process	Low variability	
			High variability	
Organization dimension	Scope	Scope in which BPM is applied	Intra-organizational processes	
			Inter-organizational processes	
	Industry	Industry in which BPM is applied	Product industry	
			Service Industry	
			Product & Service Industry	
	Size	Size of the organization in which BPM is applied	Start-up	
			Small and medium enterprise	
			Large organization	
	Culture	Degree to which an organization's culture is supportive of BPM	Culture highly supportive of BPM	
			Culture non-supportive of BPM	
	Resources	Available resources for BPM (e.g., personnel or IT investments)	Low organizational resources	
			High organizational resources	
Environment dimension	Competitive-ness	Degree of competitive pressure	Low competitive environment	
			High competitive environment	
	Uncertainty	Degree of environmental uncertainty	Low environmental uncertainty	
			High environmental uncertainty	

Evaluation Assessment Process

Do you think the Assessment Process included in the CAMAS Method is *easy to use* to assess BPM methods in a context-aware manner? Please assess the ease of use at a 7-point scale (1 – very difficult to use; 7 – very easy to use):

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

Do you have any further comments? Please comment in 1-2 sentences:

Appendix 5 – Comparison assessment results co-authors and BPM method engineers

To get insights into the validity of the assessment performed by the co-authors, we compared their classification with the original BPM method engineers and calculated hit ratios (Moore and Benbasat 1991). Hit ratios measure the frequency of correctly assigned objects (Nahm et al. 2002). H is defined as:

$$H = \frac{h}{N}$$

with $h =$ amount of correct "hits"

$N =$ amount of units to be assessed

We calculated hit ratios for each BPM method assessed by BPM method engineers and co-authors, as shown in Figure A-X. For example, the hit ratio for the BPM method proposed Bala et al. (2017), is calculated as follows:

$H = \frac{29}{31} = 0.94$ with $h = 29$ and $N = 31$

ID	Author	Lifecycle dimension (see Activity A2)	Goal dimension (see Activity A3)	Context dimension (see Activity 4)																												Validity
				Process dimension														Organization dimension												Environment dimension				
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty		
				Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Hit Ratio
7	Bala et al. 2015*	Monitoring / Project Management	Exploitation	a	na	na	na	a	a	na	a	na	a	na	a	na	a	na	na	na	a	a	a	a	na	na	a	a	a	a	na	94%
	Bala et al. 2015	Monitoring	Exploitation	a	–	–	a	–	–	–	–	–	–	–	–	–	–	–	a	na	a	–	–	–	–	–	–	–	–	–	–	–	–
8	Bala et al. 2017*	Monitoring	Exploitation	a	a	a	na	a	na	a	na	a	a	a	a	a	a	na	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	100%
	Bala et al. 2017	Monitoring	Exploitation	–	–	–	–	–	–	a	–	a	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
9	Bergener et al. 2015*	Design / Improvement and innovation	Exploitation	a	na	a	a	na	a	na	a	na	a	a	a	a	a	a	a	a	a	na	a	a	a	na	a	a	a	a	a	a	na	94%
	Bergener et al. 2015	Improvement and innovation	Exploitation	–	–	–	a	na	–	–	–	–	–	–	a	a	a	na	–	–	–	na	–	a	a	na	na	a	–	a	–	a	
11	Bolsinger et al. 2015*	Monitoring	Exploitation	a	na	a	a	na	a	a	a	na	a	na	a	na	a	na	a	a	a	na	a	a	a	a	a	a	a	a	a	a	na	97%
	Bolsinger et al. 2015	Monitoring	Exploitation	–	–	–	a	na	–	–	–	–	–	na	–	a	a	–	–	–	–	na	–	–	–	–	–	a	–	–	–	–	–	
15	Breuker et al. 2016*	Monitoring / Improvement and innovation	Exploitation	a	na	a	a	na	a	na	a	na	a	a	a	a	a	a	a	a	a	na	a	a	a	na	a	a	a	a	a	a	na	90%
	Breuker et al. 2016	Monitoring	Exploitation	a	na	–	a	na	–	–	–	–	a	–	a	–	a	na	–	–	–	na	–	a	a	na	na	a	–	a	–	a	
16	Cabanillas et al. 2014*	Monitoring	Exploitation	a	a	a	a	na	a	a	a	na	a	na	a	a	a	na	a	a	a	a	a	a	a	na	na	a	a	a	a	a	na	97%
	Cabanillas et al. 2014	Monitoring	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
24	Denner et al. 2018	Improvement and innovation	Exploitation	a	na	a	a	a	a	a	a	na	a	na	a	na	a	na	a	a	a	na	a	a	a	a	na	na	a	a	a	a	a	100%
	Denner et al. 2018	Improvement and innovation	Exploitation	a	na	a	a	a	a	a	a	na	a	na	a	na	a	na	a	a	a	na	a	a	a	a	na	na	a	a	a	a	a	
38	Heinrich and Schön 2015*	Design / Improvement and innovation	Exploitation / Exploration	a	a	a	a	a	a	na	a	na	a	a	a	a	a	a	a	a	a	a	a	a	a	a	na	a	a	a	a	a	a	94%
	Heinrich and Schön 2015	Design	Exploitation	–	–	–	–	–	a	–	a	–	–	a	–	na	–	a	–	–	–	–	–	–	–	–	–	–	–	–	a	–	a	
41	Imgrund et al. 2017*	Design / Improvement and innovation	Exploitation	na	a	a	a	na	a	na	a	a	a	na	a	a	a	na	a	a	a	na	a	a	a	a	a	a	a	a	a	a	a	100%
	Imgrund et al. 2017	Improvement and innovation	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	
45	Khlif et al. 2017*	Design / Improvement and innovation	Exploitation	a	na	a	a	na	a	a	a	na	a	na	a	na	a	na	a	a	a	na	a	na	a	a	a	a	a	na	a	na	94%
	Khlif et al. 2017	Improvement and innovation	Exploitation	–	–	–	a	–	–	–	–	–	–	a	–	–	–	a	–	–	–	–	a	a	a	–	–	a	–	–	–	–	–	
50	La Rosa et al. 2015*	Design	Exploitation / Exploration	a	na	a	a	na	a	na	a	na	a	a	a	a	a	na	a	a	a	na	na	a	a	na	na	a	a	a	a	a	na	97%
	La Rosa et al. 2015	Design	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	a	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
53	Lehnert et al. 2014*	Project management	Exploitation	a	na	a	a	a	a	a	a	na	a	a	a	a	a	na	a	a	a	na	a	a	a	a	a	a	a	a	a	a	na	100%
	Lehnert et al. 2014	Project management	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	a	–	–	a	–	–	–	–	–	
54	Lehnert et al. 2018*	Project management	Exploitation	a	na	a	a	na	a	a	a	a	a	a	a	a	a	na	a	a	a	na	na	a	a	a	na	a	a	a	a	a	na	94%
	Lehnert et al. 2018	Project management	Exploitation	a	–	a	–	–	–	–	–	–	na	a	na	a	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
58	Linhart et al. 2015a*	Project management	Exploitation	a	na	na	a	na	a	a	a	a	a	na	a	a	a	na	na	a	na	na	a	a	a	a	a	na	a	a	a	a	na	100%
	Linhart et al. 2015a	Project management	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	
61	Low et al. 2017*	Improvement and innovation	Exploitation	a	a	a	a	na	a	a	a	a	a	na	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	na	100%
	Low et al. 2017	Improvement and innovation	Exploitation	–	–	–	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
65	Manderscheid et al. 2015*	Project management	Exploitation	a	na	na	a	a	a	a	a	a	a	na	a	a	a	na	a	a	a	na	a	a	a	a	a	na	a	a	a	a	na	100%
	Manderscheid et al. 2015	Project management	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
94	Teinemaa et al. 2016*	Monitoring / Improvement and innovation	Exploration	a	na	a	a	na	a	a	a	a	a	a	a	a	a	na	a	a	a	na	a	a	a	a	a	na	a	a	a	a	a	97%
	Teinemaa et al. 2016	Monitoring	Exploitation	–	–	–	–	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	a	na	–	–	–	–	–	–	
97	van der Aa et al. 2017*	Design	Exploitation	a	a	a	a	a	a	a	a	a	a	a	a	a	a	na	a	a	a	na	a	a	a	a	a	a	a	a	a	a	a	100%
	van der Aa et al. 2017	Design	Exploitation	–	–	–	–	–	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	a	a	a	–	–	–	–	–	–	–	
98	van der Aa et al. 2018*	Monitoring	Exploitation	a	a	a	a	a	a	a	a	a	a	a	a	a	a	na	a	a	a	na	a	a	a	a	a	a	a	a	a	a	a	100%
	van der Aa et al. 2018	Monitoring	Exploitation	–	–	–	a	–	–	a	–	a	–	a	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
102	Zhu et al. 2014*	Design	Exploitation	a	a	a	a	na	a	na	a	na	a	a	a	a	a	na	a	a	a	a	a	a	a	a	na	na	a	a	a	a	na	97%
	Zhu et al. 2014	Design	Exploitation	–	–	–	a	–	–	–	–	–	–	–	–	–	a	–	–	–	–	–	–	–	–	–	–	–	–	–	a	–	a	

* BPM method assessed by original BPM method engineer

a applicable to a specific context characteristic

na not applicable to a specific context characteristic

– applicability is not assessable

Figure A-10: Comparison assessment results co-authors and BPM method engineers (20 BPM methods)

Appendix 6 – Results of applying the Selection Process with two organizations

To evaluate the Selection Process, we applied the Selection Process with two BPM method users from two different organizations, a SERVICE and PRODUCT organization, to gain preliminary insights into its ease of use, real-world fidelity, effectiveness, and efficiency. Therefore, we conducted semi-structured interviews along the activities of the Selection Process. Table A-4 summarizes the highlights from the expert interviews, Figures A-11 to A-15 show the results of applying the Selection Process.

Table A-4: Highlights from the expert interviews

Topic	Comment	Implications
Overview	• "In my option, it is crucial that organizations ensure that the applied BPM methods fit their context to ensure efficient use of resources and address internal and external customer needs" (PRODUCTION)	• Section 5.2: Included in summary of evaluation results.
	• "Defining context along multiple dimensions seems promising as it allows for a comprehensive analysis. Therefore, it is important that process-related stakeholder (e.g., process manager) are involved in each activity." (PRODUCTION)	• Section 4.4: Hint added that different BPM experts and process managers should be involved when applying the Selection Process.
	• "The Selection Process is a well-founded, yet pragmatic, way to reason about how to select BPM methods. I also liked the details provided for each activity (e.g., techniques, tools, definitions) as they helped to apply the Selection Process properly. Hence, the Selection Process helps to reduce time and uncertainty in selecting suitable BPM methods." (SERVICE)	• Section 5.2: Included in summary of evaluation results.
Lifecycle dimension	• "Defining the lifecycle stage for the process in focus is intuitive and easy for someone who knows the process and is typically involved in BPM." (PRODUCTION)	• Section 5.2: Included in summary of evaluation results.
Goal dimension	• "So far, we only focused on process improvement when applying BPM methods. However, applying BPM methods to create new processes is gaining importance in a digital age." (SERVICE)	• Section 5.2: Included in summary of evaluation results.
Context dimension	• "Even though it is important, it is difficult to set weights for the different dimensions and characteristics." (SERVICE)	• Section 4.4: Hint added that the Excel prototype proposes an initial configuration, i.e., all characteristics are equally important. The configuration can be changed as required.
	• "To analyze *DA* and *DCS* effectively, a deeper understanding of what is measured is required." (PRODUCTION).	• Section 4.4 and 5.2: Information added on to interpret *DA* and *DCS*.
	• "Choosing the right process characteristics, is not always easy and needs a lot of knowledge of the process." (SERVICE)	• Section 4.4: Hint added that different BPM experts should be involved.
Selection of BPM methods	• "The Method Base offers a good overview of existing BPM methods as it includes not only well-known BPM methods, but also unknown BPM methods that inspire to consider context from various perspectives." (PRODUCTION)	• Section 5.2: Included in summary of evaluation results.
	• "The Excel prototype helped to structure the activities that have to be done to select suitable BPM methods. However, it is still a rudimentary prototype. I would appreciate a short summary of the selected BPM method and a direct link that provide more information about the method (e.g., provide respective research article as a PDF file). Moreover, I would like to see a list of the next steps that guide me through the process after I have selected a BPM method." (SERVICE)	• Section 5.2 and 6.3: Included in summary of evaluation results and limitation added to be addressed in further research.

				Context dimension (see Activity S3)																																			
				0,6												0,2												0,2											
				Process dimension												Organization dimension												Environment dimension											
				0,2			0,2		0,2		0,2		0,1		0,1		0,2		0,1			0,1			0,3		0,3		0,7		0,3		Indicator (see Activity S4)					
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty							
				Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of applicability (DA)	Rank (DA)	Degree of context specificity (DCS)					
ID	**Author**	**Lifecycle dimension (see Activity S1)**	**Goal dimension (see Activity S2)**	1	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1	0	0	0	1	1	0	1	1	0	1	0	1	0	1						
94	Teinemaa et al. 2016*	Improvement and innovation	Exploration	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	1	78%	1	17%					
38	Heinrich and Schön 2015*	Improvement and innovation	Exploration	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	76%	2	19%					

* BPM method assessed by original BPM method engineer

Figure A-11: Results of applying the Selection Process to the process (P1) define and document architecture of SERVICE (risk-averse mode)

				Context dimension (see Activity S3)																														Indicator (see Activity S4)		
				0,1													0,5												0,4							
				Process dimension													Organization dimension												Environment dimension							
				0,3			0		0,4		0		0,3		0		0,5		0			0			0,3		0,2		0,5		0,5					
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty					
				Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of applicability (DA)	Rank (DA)	Degree of context specificity (DCS)
ID	**Author**	**Lifecycle dimension (see Activity S1)**	**Goal dimension (see Activity S2)**	0	1	0	0	1	0	1	0	1	0	1	1	0	1	0	1	0	0	0	1	1	1	0	1	0	0	1	0	1	0	1			
97	van der Aa et al. 2017*	Design	Exploitation	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	100%	1	6%
38	Heinrich and Schön 2015*	Design	Exploitation	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	96%	2	19%
9	Bergener et al. 2015*	Design	Exploitation	1	0	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	0	73%	3	24%
102	Zhu et al. 2014*	Design	Exploitation	1	1	1	1	0	1	0	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1	0	66%	4	27%
3	Anastassiu et al. 2016	Design	Exploitation	1	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	63%	5,5	21%
50	La Rosa et al. 2015*	Design	Exploitation	1	0	1	1	0	1	0	1	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	0	1	1	1	1	0	63%	5,5	35%
84	Ruiz et al. 2015	Design	Exploitation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	55%	7	9%
45	Khlif et al. 2017*	Design	Exploitation	1	0	1	1	0	1	1	1	0	1	0	1	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	0	54%	8	
39	Heinrich and Schön 2016	Design	Exploitation	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	47%	9,5	15%
42	Janiesch and Diebold 2016	Design	Exploitation	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	47%	9,5	16%

* BPM method assessed by original BPM method engineer

Figure A-12: Results of applying the Selection Process to the process (P2) establish product group advisory of SERVICE (risk-averse mode)

ID	Author	Lifecycle dimension (see Activity S1)	Goal dimension (see Activity S2)	Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability
				Context dimension (see Activity S3)												
				0,6												
				Process dimension												
				0,3			0,1		0,3		0,1		0,1		0,1	
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability	
ID	Author	Lifecycle dimension (see Activity S1)	Goal dimension (see Activity S2)	0	0	1	1	0	0	1	1	0	1	0	1	0
47	Johannsen and Fill 2014	Implementation	Exploitation	0	0	0	0	0	0	1	0	1	0	0	0	1
33	Fdhila et al. 2015	Implementation	Exploitation	1	0	1	0	0	0	0	0	0	0	0	0	0
71	Maamar et al. 2016	Implementation	Exploitation	0	0	0	0	0	0	1	0	0	0	0	0	0
90	Rangiha et al. 2016	Implementation	Exploitation	0	0	0	0	1	0	1	0	1	0	0	0	1
107	Trkman et al. 2015	Implementation	Exploitation	1	0	0	0	0	0	0	0	0	0	0	0	0
59	Lanz and Reichert 2014	Implementation	Exploitation	1	0	0	0	0	0	0	0	0	0	0	1	0

ID	Author	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of applicability (DA)	Rank (DA)	Degree of context specificity (DCS)
		Context dimension (see Activity S3)																		
		0,2												0,2						
		Organization dimension												Environment dimension						
		0,5		0			0			0,2		0,3		0,1		0,9		Indicator (see Activity S4)		
		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty				
ID	Author	0	1	1	0	0	0	0	1	1	0	1	0	1	0	1	0			
47	Johannsen and Fill 2014	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	32%	1	27%
33	Fdhila et al. 2015	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	28%	2	15%
71	Maamar et al. 2016	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	22%	3,5	12%
90	Rangiha et al. 2016	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	22%	3,5	23%
107	Trkman et al. 2015	0	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	14%	5	23%
59	Lanz and Reichert 2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6%	6	15%

* BPM method assessed by original BPM method engineer

Figure A-13: Results of applying the Selection Process to the process (P3) export control classification of SERVICE (risk-averse mode)

				Context dimension (see Activity S3)																																	
				0,8												0,2														0,0								
				Process dimension												Organization dimension														Environment dimension								
				0,2			0,2		0,2		0,2		0,1		0,1		0,3		0,1			0,1			0,1		0,4		0,7		0,3		Indicator (see Activity S4)		
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty				
				Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variablity	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty	Degree of applicability (DA)	Rank (DA)	Degree of context specificity (DCS)
ID	Author	Lifecycle dimension (see Activity S1)	Goal dimension (see Activity S2)	0	0	1	1	0	0	1	1	0	1	0	1	0	1	0	0	0	1	0	1	0	1	0	1	0	1	1	0	1	0			
53	Lehnert et al. 2014*	Project management	Exploitation	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	1	0	100%	1,5	21%
103	CAMAS Method*	Project management	Exploitation	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100%	1,5	0%
54	Lehnert et al. 2018*	Project management	Exploitation	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	1	1	0	1	1	1	1	0	98%	3	23%
65	Manderscheid et al. 2015*	Project management	Exploitation	1	0	0	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	1	0	84%	4	23%
58	Linhart et al. 2015a*	Project management	Exploitation	1	0	0	1	0	1	1	1	1	1	0	1	1	1	0	0	1	0	0	1	1	1	1	0	1	1	1	1	0	82%	5	32%
7	Bala et al. 2015*	Project management	Exploitation	1	0	0	0	1	1	0	1	0	1	0	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	0	50%	6	45%
82	Rocha et al. 2015	Project management	Exploitation	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	38%	7	32%

* BPM method assessed by original BPM method engineer

Figure A-14: Results of applying the Selection Process to the process (P5) control performance indicators of PRODUCT (risk-averse mode)

				Context dimension (see Activity S3)																																			
				0,6														0,3												0,1										
				Process dimension														Organization dimension												Environment dimension										
				0,25			0,25		0		0		0,25		0,25		0,25		0,25		0			0,25		0,25		0,6		0,4		Indicator (see Activity S4)							
				Value contribution			Repetitive-ness		Knowledge intensity		Creativity		Inter-dependence		Variability		Scope		Industry			Size			Culture		Resources		Competitive-ness		Uncertainty										
				Core process	Management process	Support process	Repetitive	Non-repetitive	Low knowledge-intensity	High knowledge-intensity	Low creativity	High creativity	Low interdependence	High interdependence	Low variability	High variability	Intra-organizational processes	Inter-organizational processes	Product industry	Service industry	Product & service industry	Start-up	Small and medium enterprise	Large organization	Culture highly supportive of BPM	Culture non-supportive of BPM	Low organizational resources	High organizational resources	Low competetive environment	High competetive environment	Low environmental uncertainty	High environmental uncertainty									
ID	**Author**	**Lifecycle dimension (see Activity S1)**	**Goal dimension (see Activity S2)**	0	0	1	1	0	1	0	1	0	0	1	1	0	0	1	0	0	1	0	1	1	0	0	1	0	1	1	0	1	0	**Degree of applicability (DA)**	**Rank (DA)**	**Degree of context specificity (DCS)**						
9	Bergener et al. 2015*	Improvement and innovation	Exploitation	1	0	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0	93%	2	24%						
15	Breuker et al. 2016*	Improvement and innovation	Exploitation	1	0	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0	93%	2	24%						
38	Heinrich and Schön 2015*	Improvement and innovation	Exploitation	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	93%	2	19%						
61	Low et al. 2017*	Improvement and innovation	Exploitation	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	85%	4	3%						
41	Imgrund et al. 2017*	Improvement and innovation	Exploitation	0	1	1	1	0	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	78%	5,5	21%						
45	Khlif et al. 2017*	Improvement and innovation	Exploitation	1	0	1	1	0	1	1	1	0	1	0	1	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	0	78%	5,5	35%							
24	Denner et al. 2018*	Improvement and innovation	Exploitation	1	0	1	1	1	1	1	1	0	1	0	1	0	1	0	1	1	1	0	1	1	1	0	0	1	1	1	1	1	1	70%	7	28%						
77	Polpinij et al. 2015	Improvement and innovation	Exploitation	1	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	53%	8	35%						

* BPM method assessed by original BPM method engineer

Figure A-15: Results of applying the Selection Process to the process (P6) purchase row materials of PRODUCT (risk-averse mode)

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