Overview of context awareness approaches in Business Process Management

Reference	Description	Requirements	Shortcomings
(Rosemann, Recker, & Flender, 2008)	Stratified framework differentiating four forms of context into concentric layers of an onion model: immediate, internal, external, environmental	• Specification of the contextual factors in the four layers	• Taxonomy as an initial reference on research in process contextualization • No specification of the extraction of the contextual factors
(vom Brocke, Zelt, & Schmiedel, 2016)	Integrated framework of contextual factors related to four dimensions: goal, process, organization, environment	• Specification of the contextual factors in the four dimensions	• Contextual factors requiring empirical investigation in BPM • More research on validation and extension of contextual factors
(vom Brocke et al., 2021)	Context-Aware BPM Method Assessment and Selection (CAMAS) Method helping to assess contexts for BPM methods application and select BPM methods for given contexts	• Set of BPM methods (method bases) • Classification framework (Excel) • Specification of contextual factors	• Assumptions of the method • Evaluation • No specification of the contextual factors extraction
(Anastassiu, Santoro, Recker, & Rosemann, 2016)	Method to identify the contextual elements of a process based on the analysis of a process model	• process model and process related information (input, output, resources, and activities) • Context-related information	• Lack of detailed information in process models • Lack of formalization • Focus on immediate/internal contextual elements based on the process model
(Hoang & Jung, 2014)	Ontological framework for context-aware collaborative business process formulation	• Process execution data (event logs) • Ontologies	• Focus on primitive ontologies • Context information is limited to process execution data and ontologies
(Bucchiarone, Marconi, Pistore, & Sirbu, 2011)	Framework supporting context-aware evolution of processes based on process instance execution and adaptation history, identifies recurring adaptation needs	• Process execution data (event logs)	• Context information is limited to process execution data • Lack of specific solutions for the identified adaptation needs
(De Maio, Fenza, Loia, Orciuoli, & Herrera-Viedma, 2016; Enrique, De Maio, Fenza, Loia, & Orciuoli, 2016)	Framework, model for context-aware heterogeneous group decision making in processes	• Data regarding decision making (decision makers, opinions, weights, records of past decision making) • Contexts modelled with Semantic Web languages and vocabularies like OWL2 and SKOS	• Focus on decision makers and opinion weights • Limitations regarding weights learning • Context information is limited to Semantic Web languages and vocabularies like OWL2 and SKOS
(Wang, Shi, Li, & Liu, 2016)	Framework for context-aware semantic complex event processing	• Event log • Event ontologies	• Focus on event log data • Context information is limited to ontologies
(Hompes, Buijs, & van der Aalst, 2016)	Framework to analyze key process performance indicators by considering the process context	• Event log • Descriptive context labels assigned to process entities by applying context functions	• Focus on event log data • Careful interpretation of the results of the automated analysis technique
(Ploesser, Recker, & Rosemann, 2010)	Conceptual model of context-awareness comprising process elements, goals, and context elements	• KPIs • Expert interviews	• Limitations of the expert interviews
(Boukadi, Chaabane, & Vincent, 2009)	Framework for context-aware process modeling considering functional, non-functional, and environmental contexts	• Roles, business rules, goals • process model	• Focus on modeling • Abundant non-functional and environmental contextual factors • No specification of the extraction of the contextual factors
(Saidani & Nurcan, 2009)	Context model for process modeling including information on who, what, where, when, why, how	• Roles, business rules, goals • Process model • Context information	• Focus on modeling • No specification of the contextual factors extraction
(Rekik, Boukadi, & Ben-Abdallah, 2017)	Framework to integrate context awareness in process outsourcing to the cloud, includes process (KPI, workload), temporal, resource (cost, risk, performance) contexts	• Process execution data (event logs) • Context information	• Focus on the specific problem • No specification of the contextual information extraction
(Mounira & Mahmoud, 2010)	Context-aware process mining framework for process flexibility	• Event log • Process mining and context awareness components	• Focus on process mining and technical perspective

		• Contextual variables	
(Said, Chaabane, Andonoff, & Bouaziz, 2014)	BPMN metamodel for modeling process variability of considering the contextual dimension	• Context parameters including goal, resources, data, behavioral	• Focus on process modeling
(Song, Vanthienen, Cui, Wang, & Huang, 2019b)	Context-aware business process management ecosystem including context-aware process models, context models, decision models and context-aware process execution	• Process execution data (event logs) • Process models • Decision rules • Context ontology	• Focus on methodology • Focus on the Internet of Things • Complex requirements • Context interpretation
(Cartelli, Di Modica, & Tomarchio, 2015)	Cost-centric model for context-aware (resources, environment) simulations of processes	• Process execution data (event logs) • Process models • Context models	• Focus on simulations and costs • No specification of the contextual information extraction
(Song, Vanthienen, Cui, Wang, & Huang, 2019a)	DMN-based method for context-aware process modeling	• Context-dependent decisions • Process and decision models	• Focus on methodology • Focus on decision modeling
(Liptchinsky, Khazankin, Truong, & Dustdar, 2012)	Approach and a graphical notation to model context-aware collaboration processes	• Process context information, including related actors and artifacts	• Focus on modeling of collaboration processes • Absence of explicit communication entities (events or messages)
(Hidri, M'tir, Ben Saoud, & Ghedira-Guegan, 2019)	Metamodel for context-aware adaptive business process as a service in a collaborative cloud environment	• Service, provider, customer, BPaaS, environment context information	• Conceptual formalisation • No specification of the contextual information extraction

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