Flexibility and Evolution in Process-Aware Information Systems: All Problems Solved?

Stefanie Rinderle-Ma

University of Vienna
Faculty of Computer Science
Research Group Workflow Systems and Technology
stefanie.rinderle-ma@univie.ac.at

Flexibility and evolution in Process-Aware Information Systems (PAIS) have been intensively investigated for almost two decades and mature solutions [RW12], academic prototypes, e.g., the CPEE [MRM14], and even commercial systems, e.g., AristaFlow [LKRD10] have been developed. Starting from this statement, one could ask the following questions:

- Are there still open challenges and questions?
- Is the adoption of flexible PAIS still behind expectations in practice? And if yes, why is this?

The talk tries to answer these questions along the following building blocks:

1. *Current situation and state of the art.* As surveys [RRD04a, SMR+08] and books [RW12] show, flexibility and evolution in PAIS cover several dimensions ranging from design time flexibility (by underspecification or based on declarative models), runtime flexibility where we can distinguish between "foreseen" exceptions (to be dealt with by compensation or rollback) and "unforeseen" exceptions (dealt with by, e.g., ad-hoc changes of single process instances) to process evolution (meaning the migration of running process instances after changing the process schema). In addition, different kinds of flexibility might arise in interplay [RRD04b]. But not only process models and instances might be subject to change, also other aspects of the PAIS can undergo adaptations such as the organizational structures and access rules [RR07].
2. *Challenges and requirements from practical projects.* Insights from developing flexible process technology for the manufacturing domain (cf. ADVENTURE[1] project), the care domain (cf. ACaPlan[2] project), and collaborative process scenarios (cf.

[1] http://www.fp7-adventure.eu/
[2] http://cs.univie.ac.at/project/acaplan

3. *Challenges and directions in research and technology transfer.* One important conclusion that hence can be drawn is that flexibility and evolution in PAIS cannot be considered in isolation. This insight has been already gained when stating that different aspects of the PAIS might be subject to changes and changing one aspect might have more or less severe effects on the other aspects as well [RR07]. Specifically, if we understand flexibility in PAIS as a non-functional requirement, it cannot be considered in isolation from other non-functional requirements such as compliance and security, interoperability, or usability. Figure 1 sketches some of these requirements that might coincide with flexibility in PAIS. It it is obvious, for example, that without providing users with some understanding of what a change means and what effects it might have, the adoption of flexible process technology might be low [KWRM13, RWRW05]. Moreover, violating existing compliance or security requirements by changing a process model or instance is not constructive as well [LRM14]. Finally, providing flexibility only for centralized process scenarios ("in-house processes") is not enough. In turn, interoperable process scenarios between different partners or organizations can be also subject to change and it becomes even more important to be able to control the change effects potentially spreading over the collaboration [FRMR12].

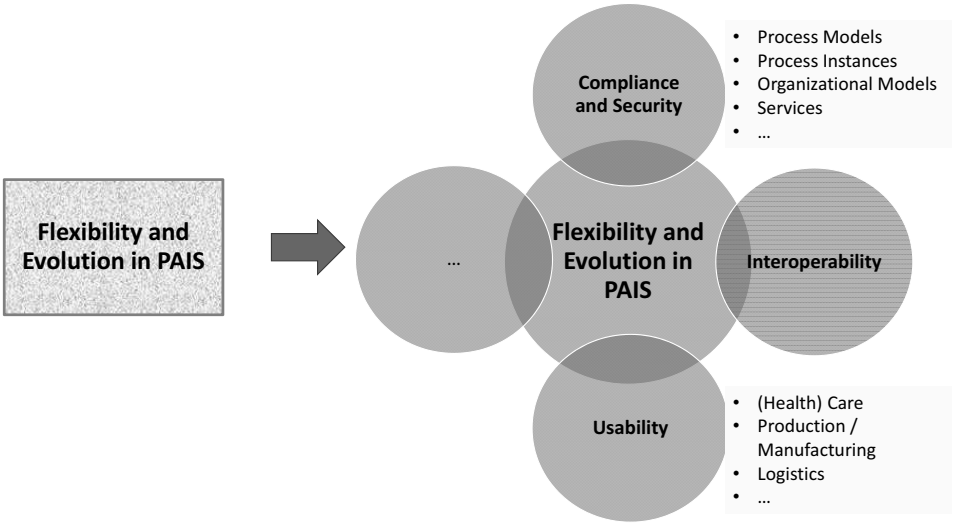

Figure 1: Flexibility in PAIS: Requirements, Aspects, and Applications

In summary, the talk will raise the claim that flexibility and evolution in PAIS are still "en vogue", i.e.., crucial in practical applications and still posing many challenges questions

[3] http://www.wst.univie.ac.at/communities/c3pro/

and research directions, particularly, at the interfaces and combinations of different aspects and requirements.

References

[FRMR12] Walid Fdhila, Stefanie Rinderle-Ma, and Manfred Reichert. Change propagation in collaborative processes scenarios. In *CollaborateCom*, 2012.

[KWRM13] Simone Kriglstein, Günter Wallner, and Stefanie Rinderle-Ma. A visualization approach for difference analysis of process models and instance traffic. In *Business Process Management*, pages 219–226. 2013.

[LKRD10] Andreas Lanz, Ulrich Kreher, Manfred Reichert, and Peter Dadam. Enabling Process Support for Advanced Applications with the AristaFlow BPM Suite. In *Business Process Management Demos*, 2010.

[LRM14] Maria Leitner and Stefanie Rinderle-Ma. A systematic review on security in Process-Aware Information Systems – Constitution, challenges, and future directions. *Information and Software Technology*, 56(3):273–293, 2014.

[MRM14] Jürgen Mangler and Stefanie Rinderle-Ma. CPEE - Cloud Process Exection Engine. In *Business Process Management Demos*, 2014. (accepted).

[RR07] Stefanie Rinderle and Manfred Reichert. A formal framework for adaptive access control models. pages 82–112, 2007.

[RRD04a] Stefanie Rinderle, Manfred Reichert, and Peter Dadam. Correctness criteria for dynamic changes in workflow systems – a survey. *Data & Knowledge Engineering*, 2004.

[RRD04b] Stefanie Rinderle, Manfred Reichert, and Peter Dadam. Disjoint and overlapping process changes: Challenges, solutions, applications. In *On the Move to Meaningful Internet Systems 2004: CoopIS, DOA, and ODBASE*, pages 101–120. 2004.

[RW12] Manfred Reichert and Barbara Weber. *Enabling Flexibility in Process-Aware Information Systems: Challenges, Methods, Technologies*. Springer, 2012.

[RWRW05] Stefanie Rinderle, Barbara Weber, Manfred Reichert, and Werner Wild. Integrating process learning and process evolution–a semantics based approach. In *Business Process Management*, pages 252–267. 2005.

[SMR+08] Helen Schonenberg, Ronny Mans, Nick Russell, Nataliya Mulyar, and Wil van der Aalst. Process flexibility: A survey of contemporary approaches. pages 16–30. 2008.