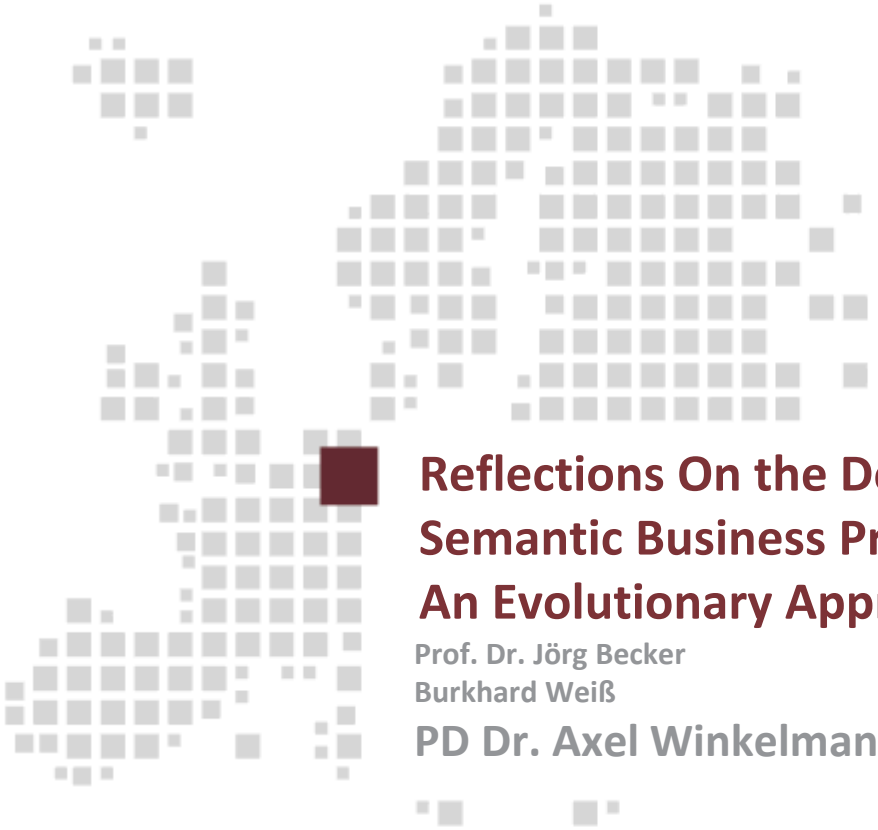

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Reflections On the Design of Domain Specific Semantic Business Process Modeling Languages – An Evolutionary Approach

Prof. Dr. Jörg Becker
Burkhard Weiß
PD Dr. Axel Winkelmann

UNIVERSITÄT KOBLENZ · LANDAU

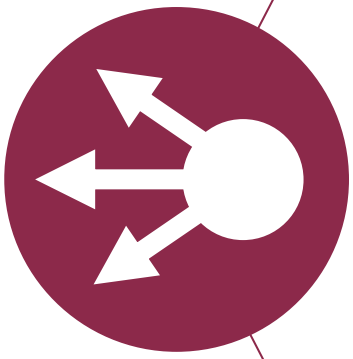
Westfälische Wilhelms-Universität Münster

Agenda

Reflections on the Adaptation of SBPML

1. Introduction: Business Process Modeling
2. Domain-Specific Process Modeling
3. Domain-Specific Modeling in Public Administrations
4. Domain-Specific Modeling in the Banking Sector
5. Synthesis of Findings: Adapting SBPML btw. Domains
6. Critical Success Factors for SBPML Adaptation
7. Conclusion, Limitations and Outlook

Initial Situation: Business Process Modeling in Banks



→ Business process modeling is important in business process reengineering – esp. in the context of industrialization in banks.

→ There are a number of general purpose modeling languages that have been developed during the last decades: UML activity diagrams, BPMN, EPC, ...

→ Automated model analysis with a semi-formal specifications of business processes is hardly possible although automated semantic analysis of business process models would allow significant cost saving potential in contrary to manual evaluation.

→ Unlike syntactic modeling languages that mainly incorporate elements from the modeling language, semantic modeling languages also use elements from the domain language in order to make statements about the problem domain.

→ We introduce research results from the application of a semantic business process modeling language (SBPML) in order to achieve easier modeling even for non-experts coupled with an automated analysis of the resulting process models in the financial sector.

Goal

→ Currently: We have more than five years of research in the area of domain-specific semantic business process modeling languages.

→ Goal: We aim at describing our findings and the development of the domain specific pattern-based process modeling language PICTURE.

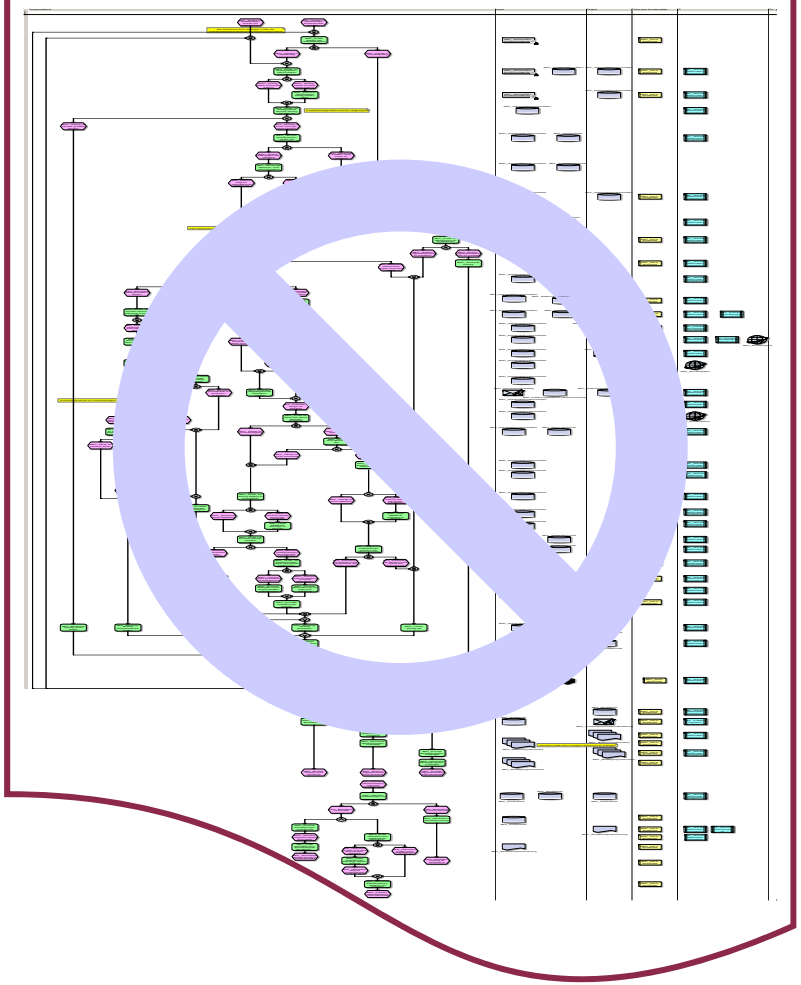
So far, the theoretical concept has been applied to administrative and service processes in the governmental and banking sector.

A comparison of both language dialects has not been taken place so far and will be our objective.

We seek to provide a first investigation on ease of adapting a SBPML based on process building blocks (PBB) and strive to identify critical success factors for transferring the domain-specific approach to further domains, for instance in the area of judiciary.

Problems of Traditional Approaches

Universal Business Process Modelling Languages

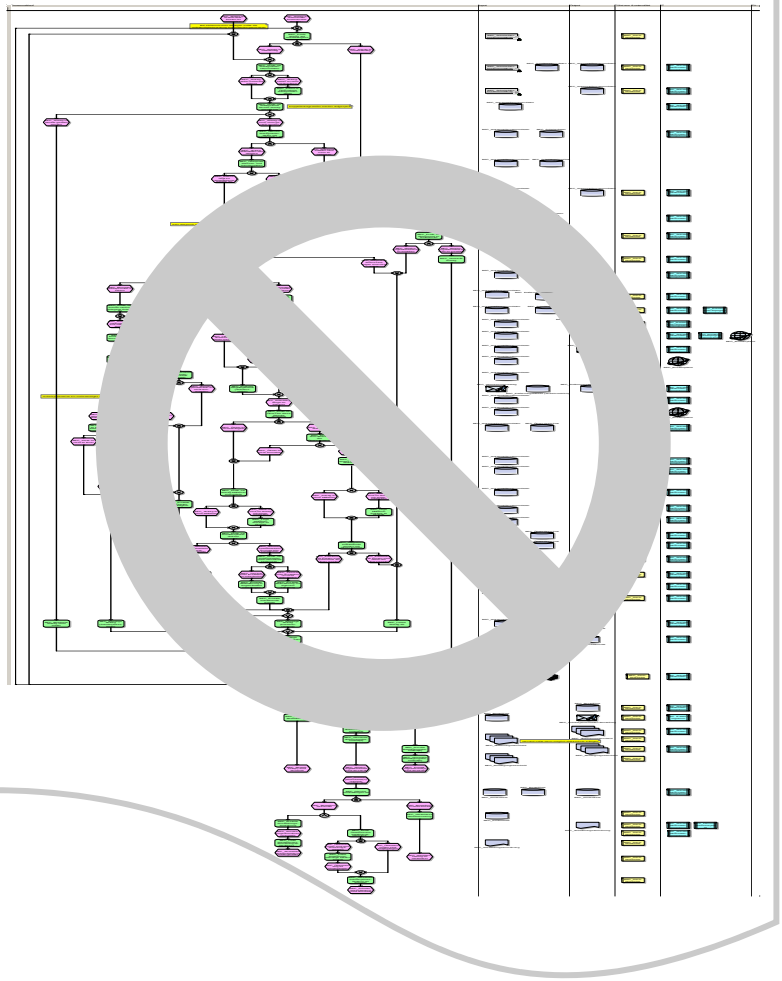


Problems of traditional approaches

- hard to understand (domain neutral)
- hard to compare (high freedom degrees)
- hard to explain (expert knowledge neccessary vor modeling)
- hardly affordable (very detailled modeling / not economically)
- hardly usable (missing semantic analysis capabilities)

Domain-Specific Process Modeling

Universal Business Process Modeling Languages



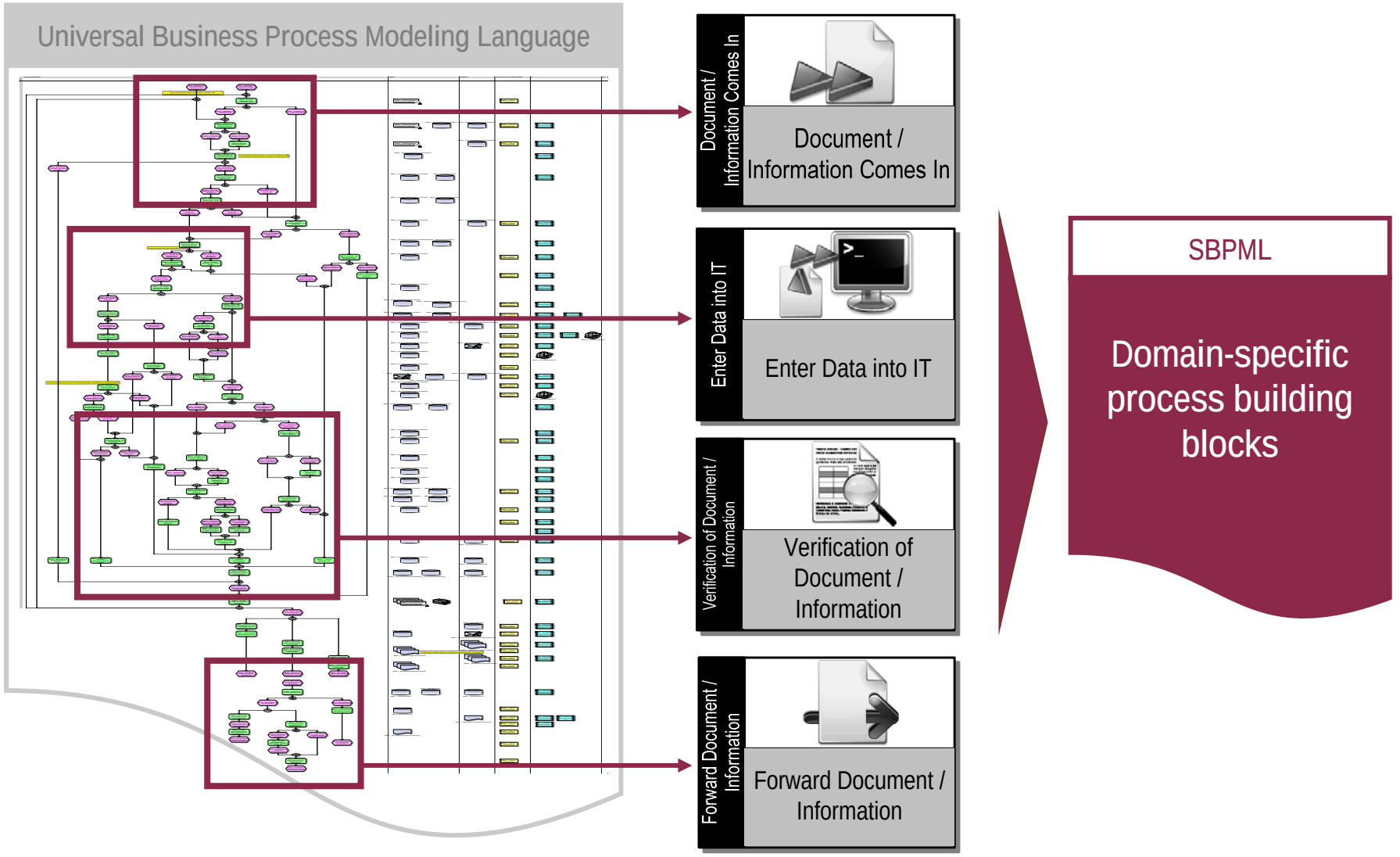
Solution Approaches

Various research projects and prototypes which deal with pattern design, identification and contextual annotations and analyses of process models have been developed.

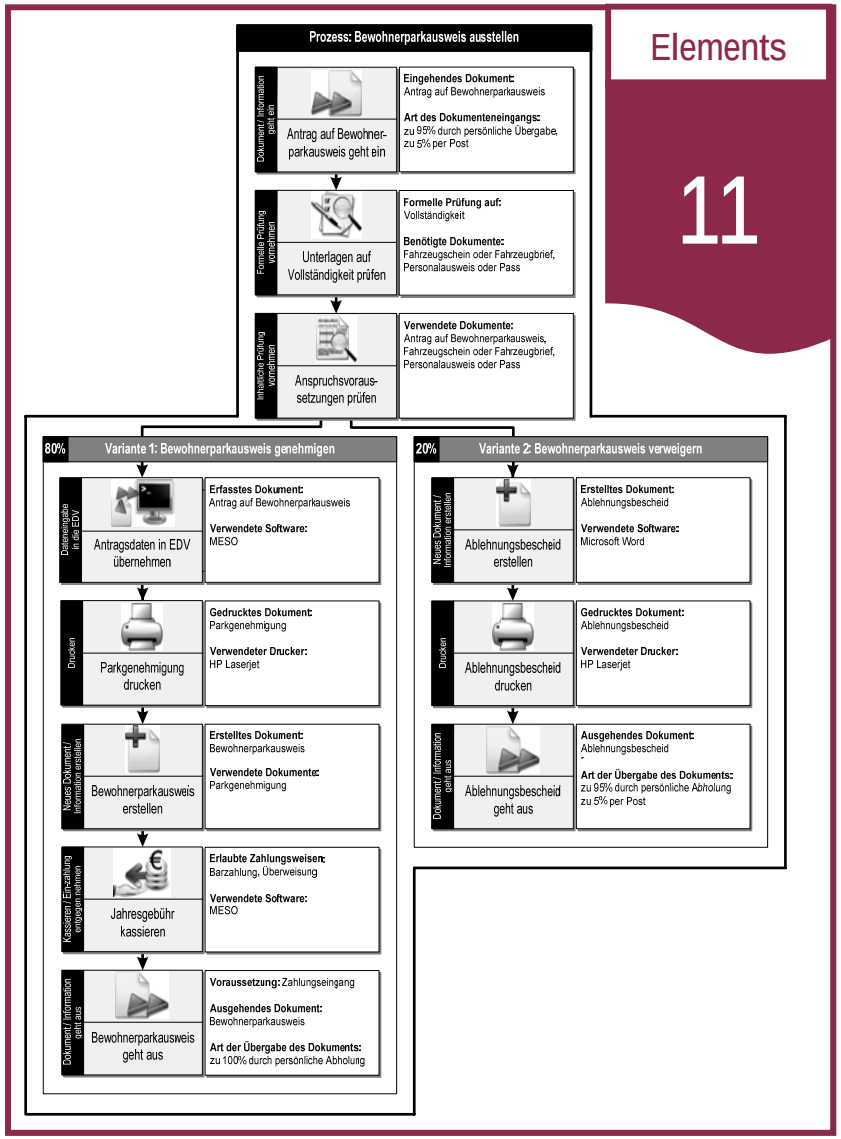
Studies have indicated that there is a lack of practically applicable and analyzable domain-specific languages.

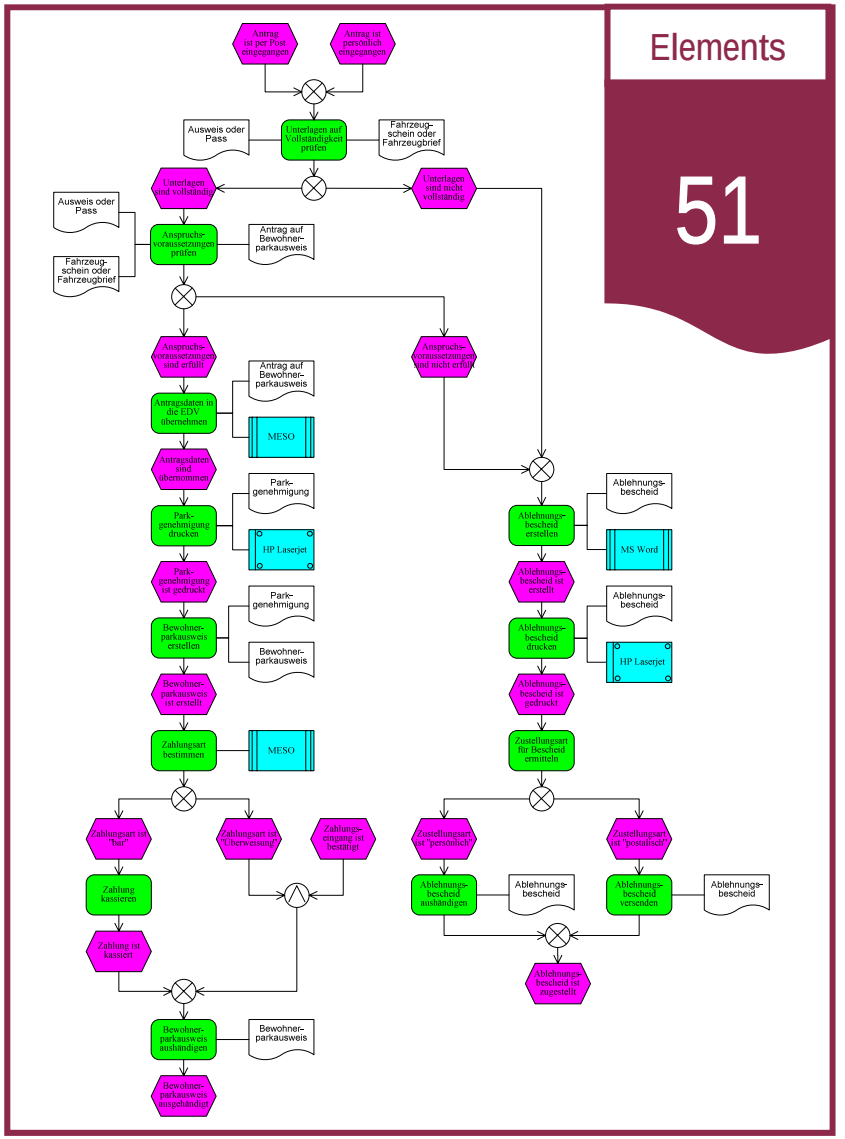
Modeling
- predefined building blocks
- domain-specific languages
- decentral and distributed modeling activities
- direct interaction with business specialists
- simple syntactical rules

Solution: SBPML

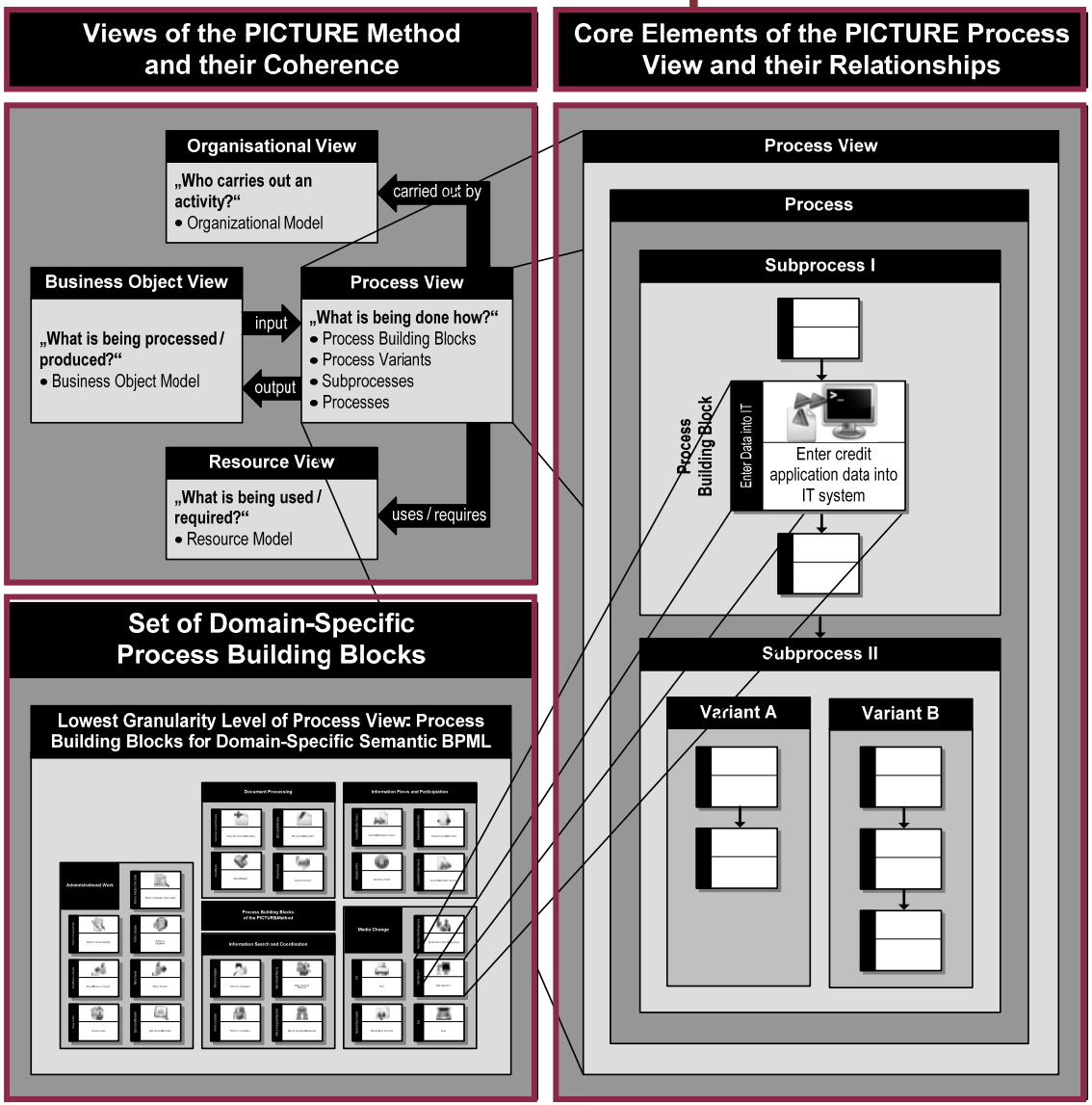


Comparison of SBPML and EPC





Domain-Specific Process Modeling

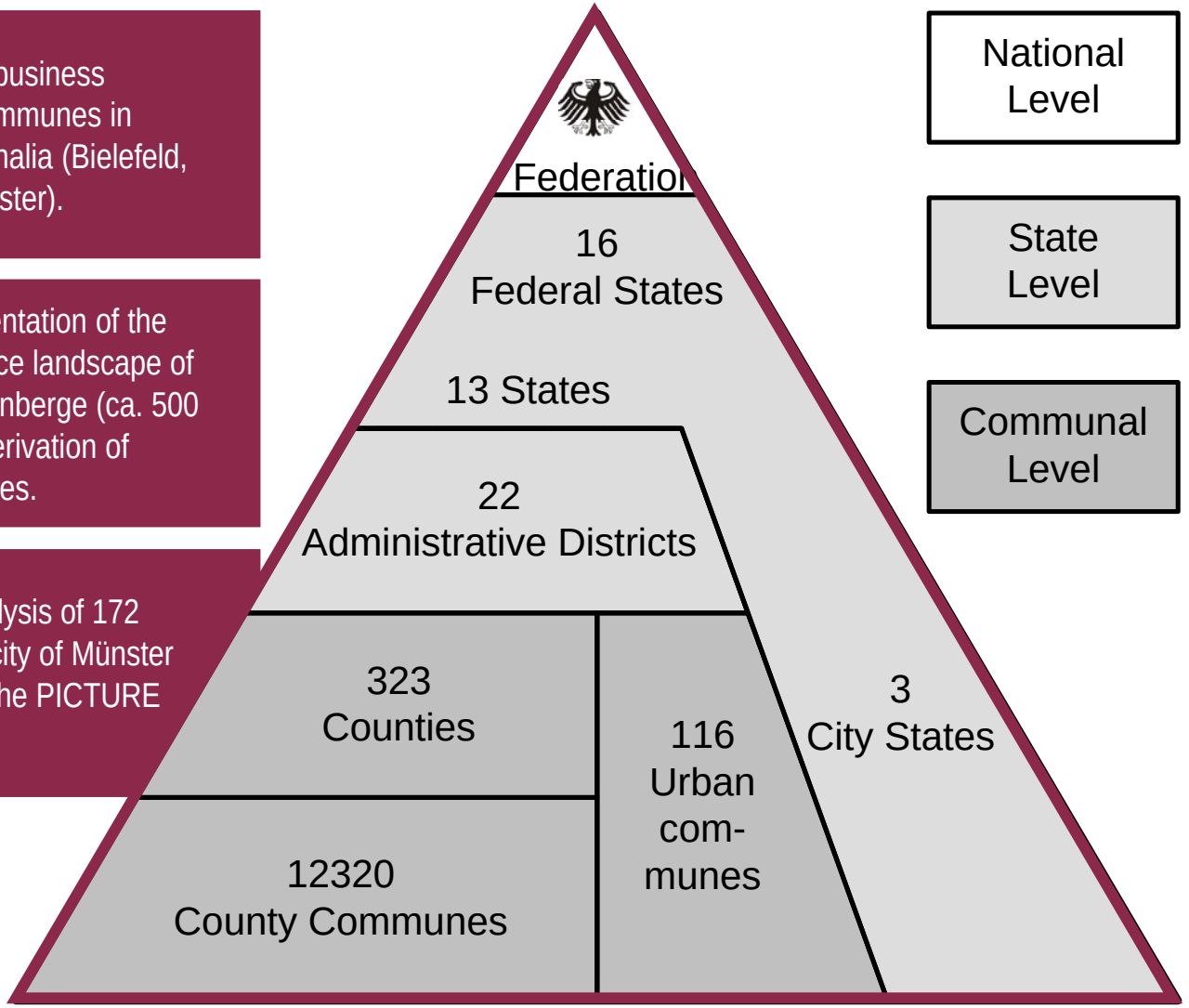


Domain-Specific Process Modeling in Public Administrations

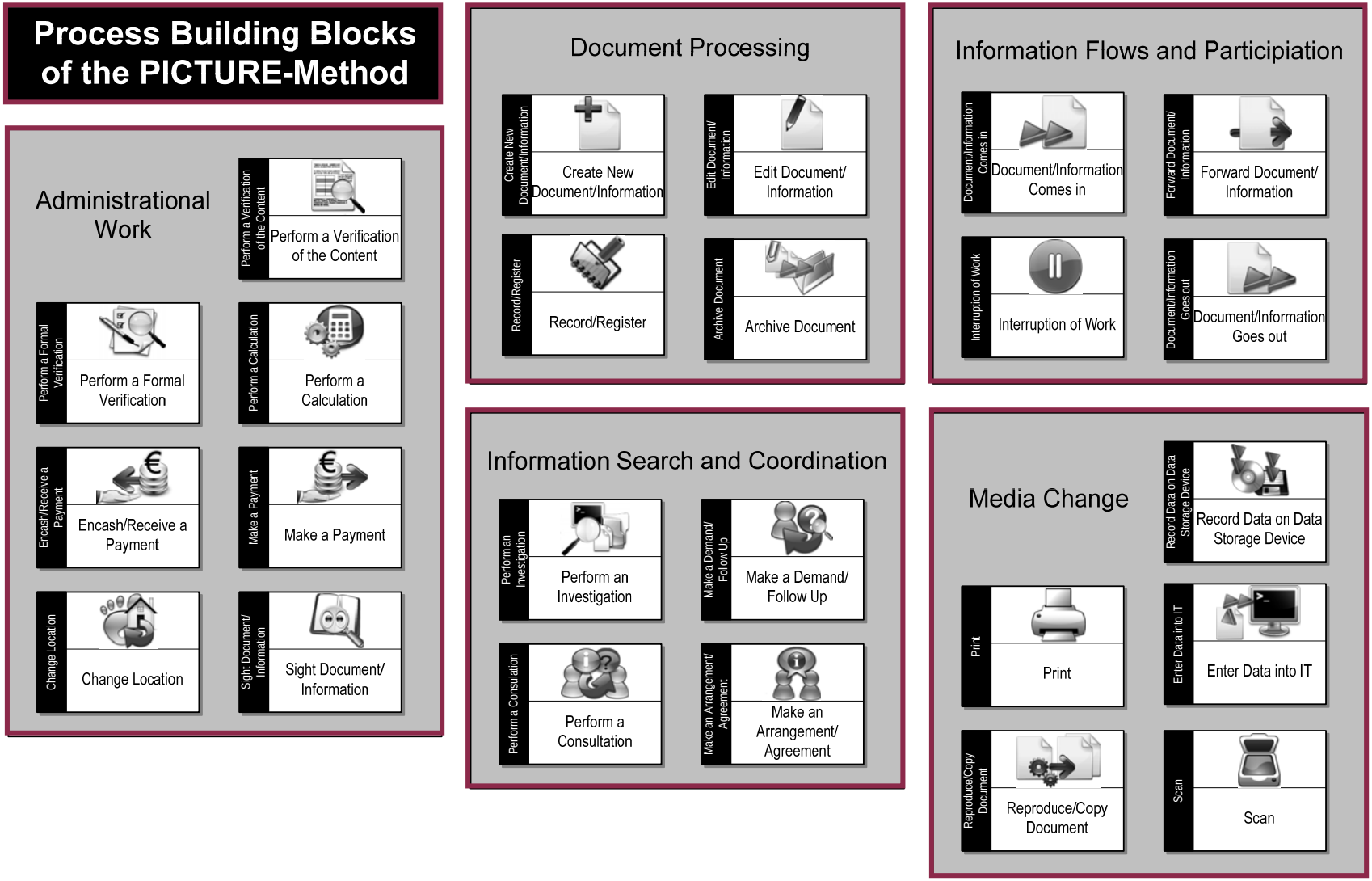
Benchmarking of business processes in 4 communes in Northrhine-Westphalia (Bielefeld, Hamm, Köln, Münster).

Complete documentation of the process and service landscape of the commune Altenberge (ca. 500 processes) and derivation of reference processes.

Modeling and analysis of 172 processes of the city of Münster and extension of the PICTURE approach.



Patterns for eGovernment



Becker, Algermissen, Falk (2009)

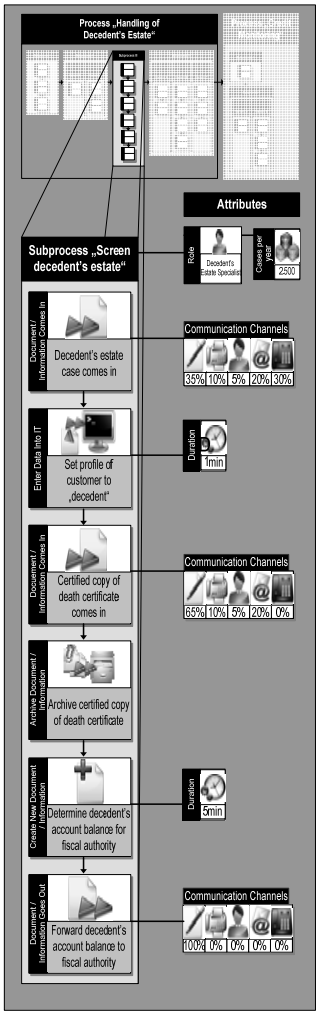
Domain-Specific Process Modeling in the Banking Sector

→ Need to extensively analyze business processes for multiple purposes (e.g. business process optimization, operational risk management, business process compliance etc.) is currently of major relevance to banks – and even more important due to the financial crisis. With the shared ambition among many banks to industrialize banking processes, the need to model, document and analyze the process landscapes of banks is omnipresent.

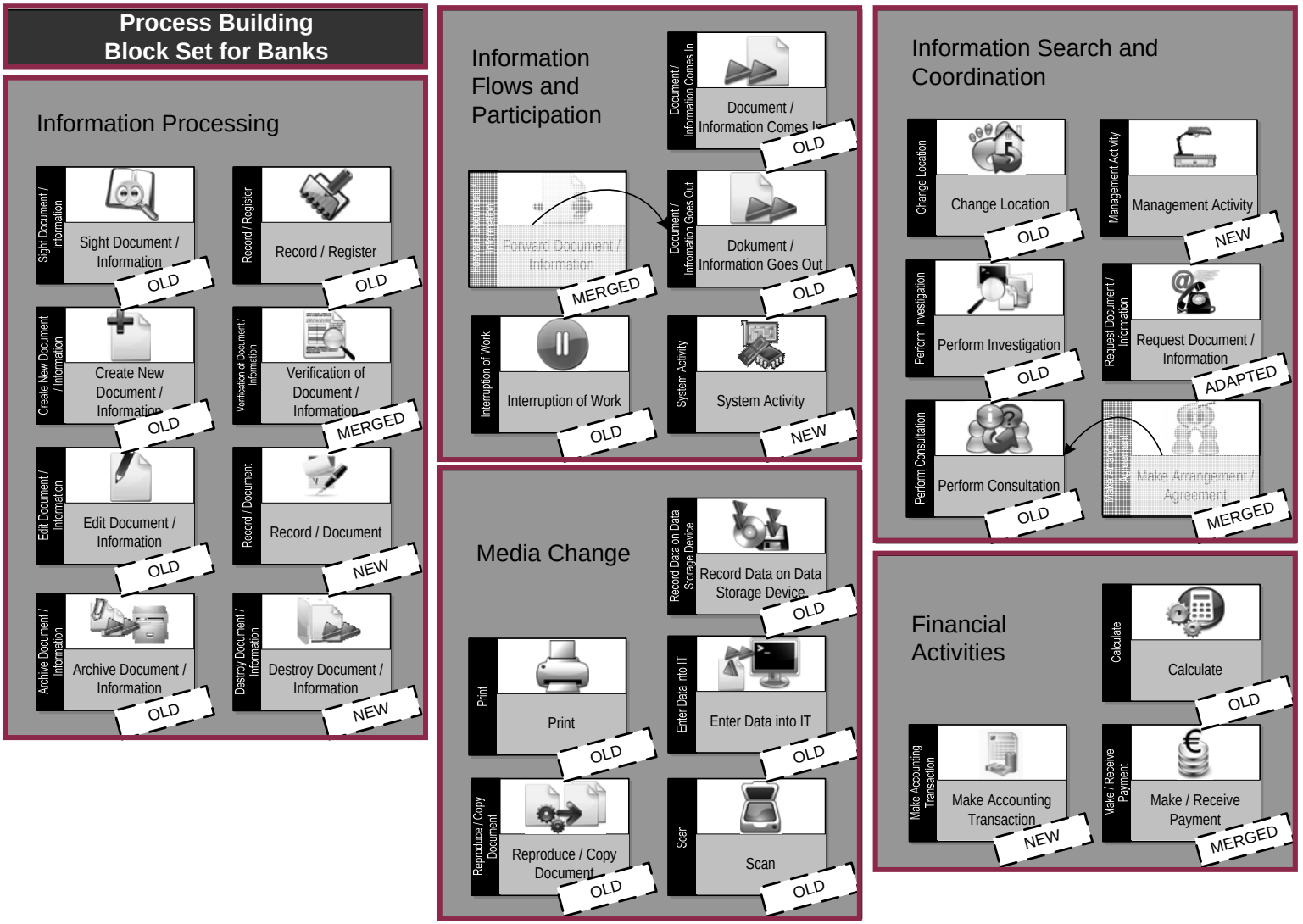
→ During three projects in banks we were faced with modeling and analyzing the core processes in order to identify IT investment and reorganization potential. As the business process modeling languages used in these banks (IDEF models, EPCs and flow charts) did not satisfy the banks with regard to analysis possibilities we adapted the method to suite the banks' needs.

→ As a semantic process modeling language consists of both syntactical and semantic domain elements, we expected certain adaptations in order to make the language work in a new domain. However, we found out that we only needed slight modifications of the PICTURE notation (e.g. in the PBBs used) to model all business processes of the banks.

Sample Process with Detailed Subprocess in PICTURE Notation



Patterns for Banking



Becker, Weiß, Winkelmann (2010)

Synthesis of Findings: Adapting SBPML between Domains

Evolutionary Design of PBB Sets			
	PBBs for Public Administrations		PBBs for Banks
	original set from public administration before it was adapted to banking sector		final set for banks after adaptation to needs of specialized and universal bank
Information Flows and Participation	Document / Information Comes In	Information Flows and Participation	Document / Information Comes In
	Interruption of Work		Interruption of Work
			System Activity
	Forward Document / Information		Document/Information Goes Out
	Document/Information Goes Out		
Document Processing	Create New Document / Information	Information Processing	Create New Document / Information
	Edit Document / Information		Edit Document / Information
	Record / Register		
	Archive Document		Archive Document
			Destroy Document / Information
Administrational Work	Sight Document /Information		Sight Document / Information
	Perform a Formal Verification		Verification of Document / Information
	Perform a Verification of the Content		
			Record / Document
	Perform a Calculation	Financial Activities	Calculate
	Make a Payment		Make / Receive Payment
	Encash / Receive a Payment		
			Make Accounting Transaction
	Change Location		Change Location
Information Search and Coordination	Perform Investigation	Information Search and Coordination	Perform Investigation
	Perform Consultation		Perform Consultation
	Make an Arrangement / Agreement		
	Make a Demand /Follow Up		Request Document/Information
			Preparation Activity
Media Change	Print	Media Change	Print
	Reproduce / Copy Document		Reproduce / Copy Document
	Record Data on Data Storage Device		Record Data on Data Storage Device
	Enter Data into IT		Enter Data into IT
	Scan		Scan
# of PBBs	24		24

PBB Adaptations and Results regarding Modeling and Analysis

Modeling efficiency: From various projects in the public administration domain researchers found that modeling is at least three times faster than modeling with any form of EPC notation. Using informal argument and logical proof, we claim that these results can also be transferred to the banking sector, since we only altered the BPML slightly, while keeping the large majority of its modeling paradigms and simplicity. Although we did not measure the time and resources that were necessary for modeling processes in comparison to modeling with generic modeling languages (e.g. EPC or BPMN), we observed it to be much shorter.

Analysis efficiency: With regard to automatically analyzing business process models, we consider the method to be very valuable. The process models are especially useful for automatically analyzing IT investment decisions, for process comparisons, and for IT implementation analyses (esp. for workflow management systems and document management systems because PBBs focus on information flows and document flows). Furthermore, the underlying semantic definition of each building block allows for the automatic identification of sequences.

Critical Success Factors for SBPML Adaptation

Critical Success Factors for Adapting the Semantic Business Process Modeling Language to Further Domains

Process view: many administrative tasks + linear processes + processes without many parallel tasks or many loops + processes involve many different organizational units + highly repetitive processes + significant number of laws and regulations and thus standardized processes

Business object view: focus on immaterial business objects + business object view is not very complex in its structure + focus on immaterial products directly influences the process view resulting in similar PBBs since activities focus on information, document and payment flows, but not on logistical flows or hard physical labor.

Organizational view: strictly hierarchical concepts + organizational departments, roles and responsible persons can be depicted within structured organizational charts + specialist knowledge required, fostering distributed and cooperative working with coordination that can be achieved efficiently through hierarchical structures.

Resource view: resource model not very complex, but hierarchical since e.g. intermediate products used for multiple final products (as in the industry) are rare + apart from human resources used to provide the offered services only few other resources + “products” delivered are mostly services and thus no complex structure is needed to model these

Conclusions, Limitations, Outlook

- Within the two domains of public administrations and banks, it was possible to develop a stable set of PBBs and to refine the overall method for describing core characteristic processes of the domains and for analyzing weaknesses
- Domain-neutral languages have the advantage, that they can be applied universally to any type of domain, whereas the usage of SBPML is limited to the specific domains.
- However, this new approach is more sophisticated in terms of syntactic evaluations of processes as well as – even more important – in terms of semantic evaluations due to the encapsulation of semantics in attributes and PBBs.
- To enable other institutions and companies to also benefit from semantic BPMLs like the PICTURE approach, we have presented first evidence of critical success factors for transferring the PICTURE approach to new domains.
- suitable new domains to adapt semantic BPMLs may esp. include the following, as they largely involve administrative tasks focusing on information and document flows at the core of their activities: insurance companies, juridicial institutions (such as lawyers), tax consultancies, business consultancies, vendors of digital content etc.

Contacts

Prof. Dr. Jörg Becker

E-Mail: becker@ercis.uni-muenster.de

Tel.: +49 (0) 251 83-38100

Dipl. Wirt.-Inform. Burkhard Weiß

E-Mail: burkhard.weiss@ercis.uni-muenster.de

Tel.: +49 (0) 251 83-38089

PD Dr. Axel Winkelmann

E-Mail: winkelmann@uni-koblenz.de

Tel.: +49 (0) 261 28-72525