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Abstract

Enterprise Systems (ES) can be understood as the de facto standard for holistic operational and managerial support within an organization. Most commonly ES are offered as commercial off-the-shelf packages, requiring customization in the user organization. This process is a complex and resource-intensive task, which often prevents small and midsize enterprises (SME) from undertaking configuration projects. Especially in the SME market independent software vendors provide pre-configured ES for a small customer base. The problem of ES configuration is shifted from the customer to the vendor, but remains critical. We argue that the yet unexplored link between process configuration and business document configuration must be closer examined as both types of configuration are closely tied to one another.

1. Introduction

Enterprise Systems (ES) are typically understood as bundles of technology and business expertise that are used to support an organization’s management and operations in a holistic way [3; 8; 13]. ES are provided as commercial off-the-shelf solutions by ES vendors and implemented and maintained in significant collaborative projects by vendor, customer, and consultants, creating a close relationship between vendor and customer [10].

Currently, this implementation takes up more resources than most small and midsize enterprises (SME) can afford. In the SME sector it is not only important that configuration is made more comprehensive for customers, but also that vendors – or “channel partners” of vendors (compare SAP’s [15] SME strategy) – are enabled to quickly and easily compose ES that are pre-configured to a large extent for a range of customers. This need is driven by the fact that SMEs typically define their competitive advantage through products or services rather than through more efficient administrative processes. To broaden the customer base, a goal for ES manufacturer must be to make this configuration process more comprehensive and economical. This is ultimately achieved by shortening and simplifying implementation supported by model-based mechanisms.

Increasing collaboration is a global trend. Independent units or entire organizations build temporary or permanent collaborations, which pool resources, capabilities, and information to achieve a common objective [18]. Unambiguously defined messages that are handed over from one service to another become increasingly important as they are mutual agreements, often legally binding between business partners. These messages are tightly coupled to the choreographed process within which they are exchanged. While the management [16; 20] and configuration of business processes [1; 14; 17] has gained considerable attention in academia, the interdependence of process configuration and business document configuration remains largely unexamined [9].

The objective of this paper is to elaborate on a meaningful method for handling a potentially large amount of business documents by means of controlled flexibility. Furthermore, we wish to raise awareness for the problems associated with configuring business documents and process choreographies in parallel by means of a business example. We propose a model driven method to manage this complex configuration process.

The structure of the paper is the following: We introduce the problem by means of a business case. In the following section a method for process and business document configuration is proposed. The paper concludes acknowledging related work and evaluating the approach.
2. Business Case

In order to motivate why business document and process configuration must not be perceived and treated as two separate topics, but rather as an integrated problem, consider a process including three parties: a customer, an agent, and a supplier. The customer uses the agent to find the best possible supplier and the agent places the customer order. Some suppliers will only process the customer order if a credit check has been performed. The credit check can be performed either by the agent or the supplier. The business document that is handed over from the agent to the supplier including the customer order may also comprise information on credit worthiness of the customer. This information can be configured as “optional” or “mandatory”. Cf. Figure 1 for an overview.

![Figure 1. Business case](image)

In the first case, the purchase order business document is configured so as to include the credit worthiness information as optional. Correspondingly, in every instance of this process at run-time, a purchase order can or cannot include the information as to whether the customer is credit worthy or not. In case the credit check has not been performed, the supplier may need to do this. In the second case, the credit worthiness information within the purchase order business document is configured as mandatory. Since the credit check has already been performed, the supplier does not have to check it anymore but can directly work with the result and decide as to whether the order will be processed or not. In other words, a simple configuration decision within a business document leads to quite significant changes of the agent’s and supplier’s business processes.

For the purpose of this paper it is therefore necessary to focus on both, process configuration and business document configuration. Configuration decisions concerning processes and business documents can be made at different levels of abstraction, however the main focus will be on the subsequently introduced business level.

3. Integrated configuration for interopera-bility

We argued before that in ES message exchange becomes increasingly important and that processes and their services have strong dependencies. Our method uses generic master models as a starting point for composing processes from services. Master models can either be process master models or business document master models.

![Figure 2: Inner and outer configuration](image)
A set of generic master models must be configured commencing with outer configuration. Outer configuration refers to the identification of generic master models that are necessary in a given business scenario. This can be done model-independently, i.e., by letting the user choose a context in which he acts (e.g., medium-sized, automotive organization in the U.S.). Based on this information, a set of generic master models is proposed that the user can take as a starting point for further configuration. Model-dependent outer configuration lets the user directly pick suitable master models from the entire set of objects.

In the next step, inner configuration of relevant master models is necessary. Inner configuration in the simplest case refers to switching attributes of a master model on, off, or optional. Further, more complex restriction and changes can be implemented. Again, this process can be performed model-dependently, and model-independently. Once the set of relevant documents and processes is determined, services can be generated from them. In the first instance, service definition is conceptual. A conceptual representation of a service is done on a business level. It defines general levels of agreement between business partners. The example initially introduced in Section 2 contains an agreement of this kind. Either one of the business partners must check if the customer is credit worthy. This has to be determined either by the business document or process that both partners agree upon for the purpose of collaboration. It is important to synchronize service definition with the conceptual representation of a process.

4. Related work

The UN/CEFACT Modelling Methodology (UMM) is specifically designed to provide a modeling procedure for specifying collaborative business processes, in a technology neutral, implementation independent manner [19]. However, there is no notion of process abstraction and no support for linking internal processes to processes without revealing confidential internal information.

Although document engineering methodologies exist [7], to our knowledge no comprehensive approach to business document modeling exists that exceeds pragmatic reuse of UML [2], graphical XML representation [12], text-based approaches [11] or mere graphical display (cf. SAP R/3 business object documentation).

In order to enable configurative information modeling, different approaches of model adaptation have been developed. Exemplary approaches of this type are the Semantic Object Model (SOM) [4], Multi-Perspective Enterprise Modeling (MEMO) [6], Viewpoints [5], and KOREAN [1]. An overview is given in [9], confirming that no comprehensive approach for the integrated configuration of processes and business documents exist.

5. Conclusions

Since no comprehensive empirical data exists on the subject, benefits and drawbacks can only be discussed argumentatively. The approach to integrated configuration only hints at the benefits.

It is acknowledged that the context-based configuration proposed here might lead to an even bigger amount of variants than those currently available. However, the benefits of this approach are realized by properly managing the variants so that for the most part only the master models that are utilized for configuration have to be maintained.

The configuration of processes and business documents involves a lot of parameterization. Almost any element must be annotated with appropriate contexts from several code lists. This entails an enormous initial
research effort on what to configure in which way. So it has to be ensured that the administration is economical and user-friendly. Furthermore, maintenance of the configuration parameters is complex. While high-level configuration is fairly straightforward, the inherent complexity of the necessary granular configuration of business documents and processes is rather complicated. It is therefore very important that a simple access and management makes most issues transparent to the user. While the aim is to shorten the overall time of implementation, longer delays in implementation can be expected, when new elements are introduced that are subject to an approval process.

However, the integrated contextual configuration of processes and business documents provides a promising concept for the management of variants of processes and their associated business documents for ES software. Through context-based configuration mechanisms, the means of modifications are flexible and yet restrictive. Processes and business documents can be configured to very diverse requirements but only in a predefined and traceable way. This controlled flexibility offers a feasible concept for process and business document variant management that can be employed by customers and vendors.

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