End-User Development Techniques
for Enterprise Resource Planning Software Systems

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Abstract. The intent of this position paper is to present the focus of interest of our end-user development (EUD) related research at SAP Research CEC Darmstadt, enabling other participants of the Dagstuhl seminar concerning end-user software engineering to prepare for fruitful and constructive discussions. As we are in an early phase of research, research topics will be presented rather than detailed results. We focus on investigating and applying EUD techniques suitable for enterprise resource planning (ERP) software systems, especially for small and medium-sized enterprises (SMEs). Our current research addresses the sub-domains of workflow management and business intelligence.

1 Customization of ERP systems

One dilemma of developing ERP software systems is to develop systems being on one hand generic enough to be used by a broad variety of companies and on the other hand offering solutions that match the concrete reality of a company as close as possible. As a consequence ERP systems are highly customizable, causing a long and costly implementation phase, involving external experts and consultants, which have to deal with the domain knowledge of users and adapt the software according to existing needs and processes. Since companies are not static and competitors, markets and customers are always on the move, influencing the strategies, products, services and processes of a company, a continuous need for adaptation exists which is not limited to the implementation phase of ERP software. End-users of ERP systems are domain experts but not necessarily IT professionals, limiting their ability to adapt the software by themselves to their own needs and forcing them to indirectly influence the adaptation processes by communicating their needs to IT professionals. Empowering the end-users to adapt the software by themselves is an important step in reducing customization costs and enabling high-quality tailoring of software and working environments to the needs of modern information and knowledge workers. EUD defined "as a set of methods, techniques, and tools that allow users of software systems, who are acting as non-professional software developers, at some point to create, modify or extend a software artifact" [1] may deliver significant ideas of how to improve the evolutionary process of adapting ERP systems to changing company and user needs.

2 EUDISMES

Currently we are involved in the EUDISMES (End User Development in Small and Medium Enterprise Software Systems) project lead by Prof. Dr. Wulf of Siegen University and funded by the German Federal Ministry of Education and Research (BMBF) to further investigate EUD techniques. Focusing small and medium-sized enterprises (SMEs) aggravates the need for sophisticated EUD techniques. Large enterprises usually have a high management expertise and fine grained, standardized processes, which simplifies the adoption of predefined ERP processes and contents. In contrast to large enterprises SMEs have more human centric and less rigid processes. Having less financial resources and IT expertise, many SMEs fear the challenge of ERP implementation, operation and maintenance. As described in [2] we see good opportunities for applying EUD techniques in ERP systems for SMEs, especially in the sub-domains of managing agile workflows and business intelligence applications.

2.1 Creating and Managing Workflows

To achieve transparency and efficiency in the execution of business processes they are modeled and automated as workflows involving the routing of tasks and related documents and information. In addition to an initial implementation of processes, the dynamics of market requirements necessitates an ongoing adaptation of business models and hence workflow models. Although various visual tools provide an appealing user interface, the complexity of process (re-) engineering still exceeds the capabilities of most end users. At the same time, classical workflow systems are too rigid for many users, in particular knowledge workers, tackling complex processes with significant deviations from case to case.

As organizations seek to leverage their skilled people, reduce training time and support end-to-end workflow across all aspects of the business, application software now needs to be designed for the individual. Gartner has coined this people-process intersection the "process of me" [3]. End-user development tools can help to increase the adaptability of workflow systems to individual work practices. Techniques such as programming by example can help to overcome the separation between design- and runtime, giving the possibility of and confidence in successful system control back to end users.

2.2 Customizing Business Intelligence Applications

Business Intelligence (BI) applications are tools for analyzing data for the purpose of providing relevant information to enable better and faster business decisions. This purpose of BI applications turns every employee in a potential consumer of BI applications. Since the details of business decisions are specific to each company, their processes and the user context, there is no complete analytic application out of the box. Companies spend a huge amount of time and money on the customization and extension of commercial BI products to deliver business relevant information to the user in his work context in a business-user-oriented and easy-to-use way. Since the work of modern information and knowledge workers tends to consist of more and more non-routine, cognitive, analytic and interactive tasks, users have to be empowered to find, explore, process and analyze the data they need in the situation they want in an intuitive and user-friendly way. To meet their information needs, users create or adapt suitable informational artifacts, like reports or queries, confronting them with a huge information space of available data and technical details of data storage and querying. Ideally, users should be able to develop BI artifacts, like queries, reports or key performance indicators, by only using business concepts and terminology provided by an appropriate abstraction layer hiding technical details and reflecting only business relevant data entities and their relations. Related research addresses the question of how to build such abstraction layers on top of complex ERP systems, how to allow end-users to navigate huge information spaces, how to easily orchestrate queries in a descriptive way and how to enable end-users to interactively explore and analyze data to effectively improve speed and quality of business decisions.

3 Literature

[1] H. Lieberman, F. Paterno and V. Wulf: "End-User Development", Springer, Dordrecht, 2006.
[2] A. Roth, S. Scheidl: "End-User Development for Enterprise Resource Planning Systems" in Workshop "End User Development" at "Informatik 2006", Dresden, Germany, 2006.
[3] Gartner: "Business Application Vendors Face Challenge to Move to 'The Process of Me'", 2006 (http://www.gartner.com/it/page.jsp?id=492897, accessed on Jan. 15, 2006)